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21st Century Soldiers and Noncommissioned Officers: Critical Predictors of Performance

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14. ABSTRACT *(Maximum 200 words)*:

The goal of the Soldier21 and NCO21 projects was to conduct a comprehensive analysis of future conditions and future job demands in order to identify critical performance predictors or knowledges, skills, and abilities (KSAs) that may eventually be developed into selection (Soldier21) and promotion (NCO21) criteria. Three eras were examined: the Army of Excellence (1990-2000), Army XXI (2000-2010), and the Army After 2010 (2010-2025). The specific objectives for Soldier21 were to (a) identify and describe the nature and type of changes that are expected to occur in these eras, (b) forecast future job requirements and the critical individual characteristics of soldiers who will perform proficiently, and (c) identify selection measures that might be used to assess individual characteristics. For NCO21, the objectives were to (a) provide a description of forecasted conditions affecting future NCO performance, (b) describe the future job requirements, and (c) provide a descriptive list of the main qualities needed for effective noncommissioned officer performance. This report documents the methodology and findings of this effort.

15. SUBJECT TERMS
first tour soldier; noncommissioned officer (NCO); selection criteria; promotion criteria; Army XXI; Army After Next; knowledges, skills, and abilities (KSA); job analysis

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21st Century Soldiers and Noncommissioned Officers: Critical Predictors of Performance

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May 2000

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FOREWORD

In March 1997, Major General (MG) Dean, the Director of Military Personnel Management, Deputy Chief of Staff for Personnel, directed the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) to undertake a quick study to determine the characteristics that enlistees will need to succeed in the 21st century Army. The quick study involved a summarization of available information supplemented by a "target of opportunity" data collection effort. The results of that effort were reported to MG Dean in January 1998. MG Dean then asked ARI to conduct a more complete research investigation to address this issue. ARI responded with a program known as Soldier Characteristics for the 21st Century (Soldier21).

This effort coincided with another project, entitled 21st Century Noncommissioned Officers (NCO21), initiated by ARI under the sponsorship of the Office of the Deputy Chief of Staff for Personnel. To minimize research and development resources (time, dollars, and Army personnel) an approach was developed that merged the data collection efforts for both Soldier21 and NCO21. Phase I of these projects was the development of a detailed research plan for identifying characteristics required of future junior soldiers and noncommissioned officers (NCOs).

This report summarizes the Phase II effort that augmented and executed the methodological steps of the Phase I research plan. The goal of the Soldier21 and NCO21 projects was to conduct a more comprehensive analysis of future conditions and future job demands in order to identify critical performance predictors or knowledges, skills, and abilities (KSAs) that may eventually be developed into selection (Soldier21) and promotion (NCO21) criteria. Anticipated job requirements of 21st century soldiers and NCOs (for the years 2000 through 2025) were forecasted and the most important KSAs needed for success in Army jobs were estimated.

The goal of the Selection and Assignment Research Unit of ARI is to conduct research, studies, and analysis on the measurement of aptitudes and performance of individuals to improve the Army's selection and classification, promotion, and reassignment of officers and enlisted soldiers. This research was briefed to Army leaders at a major planning exercise and will provide the foundation for ongoing and planned research to improve the selection and promotion procedures for enlisted personnel.

ZITA M. SIMUTIS
Technical Director

21st CENTURY SOLDIERS AND NONCOMMISSIONED OFFICERS: CRITICAL PREDICTORS OF PERFORMANCE

EXECUTIVE SUMMARY

Research Requirement:

Soldier Characteristics for the 21st Century (Soldier21) and 21st Century Noncommissioned Officers (NCO21) were two projects with similar goals: identify characteristics required of future soldiers. Therefore, a methodology was executed that dovetailed data collection efforts to meet the objectives of both projects. The specific objectives for Soldier21 were to (a) identify and describe the nature and type of changes that are expected to occur in the 21st century Army, (b) forecast future job requirements and the critical individual characteristics of soldiers who will perform proficiently, and (c) identify selection measures that might be used to assess individual characteristics. For NCO21, the objectives were to (a) provide a description of forecasted conditions affecting future NCO performance, (b) describe the future job requirements, and (c) provide a descriptive list of the main qualities needed for effective noncommissioned officer (NCO) performance.

Procedure:

Taxonomies of future performance predictors were synthesized by (a) identifying baseline performance requirements and predictors, (b) determining current performance requirements and predictors, and (c) augmenting current requirements with forecasts of future conditions and requirements. Establishing baseline taxonomies, particularly for specifying performance content, was implemented by drawing from a voluminous amount of existing occupational data, training content specifications, criterion development research, task manuals, and expert judgments.

Forecasting future conditions began with an extensive review of futures literature. As more was learned about the elements that would most directly affect soldier and NCO-level job requirements, the focus was narrowed to future Army doctrine and organization projections, types of missions, plans for systems development, technological advances, and social culture. Several methods were used to obtain this information: literature and Internet searches, Army publications, questionnaires, interviews with subject matter experts (SMEs), and workshops featuring panels of experts (Army SMEs and psychologists). Two future eras were targeted for study—Army XXI (AXXI) and the Army After 2010 (AA2010).

In order to analyze specific jobs, missions, and technologies that were indicative of the future, a variety of Army organizations were visited. This provided first hand estimates of future conditions that may influence job requirements and the knowledges, skills, and abilities (KSAs) that will be required to fill future Army jobs.

Findings:

The KSAs found to be potentially relevant for future selection (first tour soldiers) and promotion (NCOs) purposes were identified for five target groups:

- For first tour soldiers of the AXXI, the four most important KSAs were (a) General Cognitive Aptitude, (b) Conscientiousness/Dependability, (c) Reading Skill, and (d) Working Memory.

- For Junior NCOs of the AXXI, the four most important KSAs were (a) Conscientiousness/Dependability, (b) MOS/Occupation-Specific Knowledge and Skill, (c) General Cognitive Aptitude, and (d) Motivating and Leading Others.

- For Mid-level NCOs of the AXXI, the four most important KSAs were (a) Judgment and Decision Making; (b) General Cognitive Aptitude; (c) Directing, Monitoring and Supervising Others; and (d) Motivating and Leading Others.

- For Senior NCOs of the AXXI, the four most important KSAs were (a) General Cognitive Aptitude, (b) Motivating and Leading Others, (c) Judgment and Decision Making, and (d) Concern for Soldier Quality of Life.

- For Battle Force NCOs of the AA2010, the three most important KSAs were (a) Judgment and Decision Making, (b) General Cognitive Aptitude, and (c) Knowledge of Battlefield Function Integration.

One difference between KSAs for selection and KSAs for NCO promotion is that various aspects of an individual's current and past performance could be assessed and serve as predictors of future performance.

The following are a few of the implications that should be considered for future research and development (R&D):

- High priorities were ascribed to two major dispositional variables: conscientiousness and motivation. Judged as critical for both selection and NCO promotion, they seem worthy of significant future research investments.

- The generally high priority given to General Cognitive Aptitude for all NCO target groups implies that this KSA warrants consideration for assessment as a promotion requirement.

- For first tour selection, trying to reduce the disparity between the values of new recruits and those of the Army is given a very high priority. A number of large private sector organizations have developed instrumentation for assessing the degree of such a person/organization match. A determination of the feasibility of doing so in the Army context should be given careful consideration.

Utilization of Findings:

This information has been provided to senior Army planners charged with the responsibility of helping to prepare the Army for the demands of the 21st century. The next stage of the research will be to build measures of those KSAs which show the most promise for augmenting

current selection and promotion procedures and to evaluate the effectiveness of these tools. Recommendations regarding how to best meet 21st century mission and job demands through improved soldier assessment will follow.

21st CENTURY SOLDIERS AND NONCOMMISSIONED OFFICERS: CRITICAL PREDICTORS OF FUTURE PERFORMANCE

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21ST CENTURY SOLDIERS AND NONCOMMISSIONED OFFICERS: CRITICAL PREDICTORS OF PERFORMANCE

Introduction

In March 1997, Major General (MG) Dean, the Director of Military Personnel Management, Deputy Chief of Staff for Personnel (DCSPER), directed the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) to undertake a quick study to determine the characteristics that enlistees will need to succeed in the 21st century Army. The quick study involved a summarization of available information supplemented by a "target of opportunity" data collection effort. The results of that effort were reported to MG Dean in January 1998 (Rumsey, 1998). MG Dean then asked ARI to conduct a more complete study to address this issue. ARI responded with a two-phase program known as *Soldier Characteristics for the 21st Century* (Soldier21).

The dual-phased Soldier21 project was to be a more comprehensive effort involving the collection of new data. In May 1998, a contract effort was initiated to develop the methodology (Phase I). At the same time another project, entitled *21st Century Noncommissioned Officers* (NCO21), was initiated by ARI, again under the direction of MG Dean. To minimize research and development (R&D) resources (time, dollars, and Army personnel) an approach was developed that merged the data collection efforts for both Soldier21 and NCO21. This methodology is described in a report by J. P. Campbell, Walker, and Knapp (1998). Background summaries for the Soldier21 and NCO21 projects are provided below.

Soldier Characteristics for the 21st Century

Questions addressing the requirements that future soldiers will have to bring to the job have been asked before. At the Army 2010 Conference, Rumsey (1995) addressed the question: "…What attributes will the soldier of the future need" (p.123)? The study described in his paper was an early step to the current effort, conducted prior to the Phase I piece described above. The "future" in Rumsey's study was described using one source, the 1994 version of Pamphlet 525-5, *Force XXI Operations* (Department of the Army [DA], 1994). Six behavioral psychologists, using this future description and soldier performance dimensions as reference material, rated the importance of performance predictors (from a compiled list) for future first tour soldiers. The five highest rated performance predictors were cognitive ability, integrity, cooperativeness/teamwork, conscientiousness, and achievement motivation. However, probably more important than these findings were the questions that the study raised, such as: How are performance requirements changing, how will performance predictors be measured, and how will the Army be able to meet the challenge of finding soldiers with suitable characteristics? The current effort, Phase II, attempts to find answers to some of these questions by providing more complete and comprehensive descriptions of the conditions in which future soldiers will operate and, hence, future performance dimensions.

During Phase II we have augmented and executed the methodological steps described in J. P. Campbell et al. (1998). We have forecasted the anticipated job requirements of 21st century soldiers (for the years 2000 through 2025) and identified the most important performance predictors or knowledges, skills, and abilities (KSAs) needed by recruits to succeed in their jobs.

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The "job" that served as the exemplar for determining future demands was that of the first tour soldier. This job was defined as non-prior service personnel at skill level 1 (SL1) in the grade of E2 through non-corporal E4 (Private through Specialist). A stipulation of the Soldier21 study was that findings were to be applicable to all soldiers in the future Army regardless of their military occupational specialty (MOS). One aspect of our approach was to identify and analyze existing Army groups or soldiers participating in missions that are indicative of future ones, organizations that are testing or operating with future or advanced technologies, and proponents that are training soldiers for jobs that will become more critical in the future.

The objectives for Soldier21 were threefold:

- Identify and describe the nature and type of changes that are expected to occur in the 21st century Army.

- Project future job requirements and the critical individual characteristics of soldiers who will perform proficiently in the next century.

- Identify selection methods that might be used to assess individual characteristics.

The current effort identified the most important KSAs for the Army over the next 25 years. Through further research, measures of these KSAs could be validated and integrated into the Army selection and promotion systems. However, the KSAs must be continuously updated and refined as the future unfolds because the job requirements identified herein will undoubtedly evolve and change. With this caveat, the use of the findings can lead to a 21st century Army that will more likely be successful in selecting the most appropriate people.

21st Century Noncommissioned Officers

The Soldier21 project is related to, and integrated with, a parallel project that focuses on noncommissioned officer (NCO) performance requirements for the same period, 2000-2025. The battlefield of the future will require NCOs who can train forces and operate effectively in digital environments with increased mission diversity, fewer soldiers, and organizational and social changes. Accordingly, the future NCO promotion system will need new identification and measurement procedures to evaluate the full scope of performance needed to successfully meet job requirements.

Previous work on NCO21 issues has been documented by Rumsey, Busciglio, and Simsarian (1997) and Rumsey, Webber, and Busciglio (1998). These efforts were exploratory in nature, mainly concentrating on the methodological issues involved in the endeavor to identify requirements for jobs that "…do not yet exist in their entirety and estimating how well individuals with varying profiles on certain abilities and other characteristics are likely to meet these future requirements" (Rumsey et al., 1997, p. 2). However, preliminary data collection efforts did yield some interesting forecasts. In discussions with more than 100 NCOs and officers, three future conditions emerged that may affect future job requirements: (a) increasingly sophisticated technology, (b) continued downsizing of personnel, and (c) an increase in the diversity and frequency of missions. These conditions, although not definitive, suggested performance predictors such as cognitive aptitude, motivation, integrity, self-discipline, and adaptability that were worth exploring as future NCO promotion criteria.

The goal for this phase of the NCO21 study was to conduct a more comprehensive analysis of future conditions and future job demands in order to identify critical KSAs that may eventually be developed into promotion criteria. Unlike the Soldier21 objective that focused on identifying KSAs that would be used to select civilians with no prior job performance history, the NCO21 analysis considered at least two types of performance predictors: (a) those that represent general aptitudes, and (b) those that reflect performance in current or previous Army jobs.

Another difference that emerged between the Soldier21 and NCO21 efforts was the number of target groups that were defined. In Soldier21, the job being examined was that of the first tour soldier during approximately the first four years of service. But, NCO careers may span more than 30 years, encompassing many levels of responsibility and skill (Table 1 illustrates the NCO career span). It became apparent that the identification of job requirements for NCO as a single entity was too broad and undefined. Consequently, we divided the NCO domain into three target groups:[1]

- *Junior NCO.* Junior NCOs are SL1 and SL2 personnel (Corporal E4 and E5). They generally have between 4 and 7 years in service. They have a variety of jobs, with increasing responsibility, but usually within a unit or organizational setting that corresponds to their MOS.

- *Mid-Level NCO.* These are SL3 and SL4 soldiers (E6 and E7), with 7-15 years in service (for some, this will be the limit of their advance). Their responsibilities include increasingly more non-MOS-related assignments.

- *Senior NCO.* These SL5 soldiers (E8 and E9) have 15 or more years in service. Some First Sergeant and Master Sergeants have assignments within their job categories, but most have non-specific, leader assignments.

Table 1
Noncommissioned Officer Ranks, Grades, and Skill Levels

Rank	Grade	Skill Level (SL)
Corporal	E4	SL1
Sergeant	E5	SL2
Staff Sergeant	E6	SL3
Sergeant First Class	E7	SL4
First Sergeant and Master Sergeant	E8	SL5
Sergeant Major and Command Sergeant Major	E9	SL5

With the additional requirement of examining several NCO target groups, the objectives of this parallel project were to:

- Provide a description of forecasted conditions affecting future NCO performance.

- Describe the future job requirements.

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[1] Although there are eight distinguishable ranks in the NCO field (as shown in Table 1), our three target groups were a compromise between a single NCO grouping and eight groupings, which were considered too taxing for the resources of this study. The three target groups are specific to this study only and do not reflect actual Army application. For example, the Army defines "Senior NCO" as E7, E8, and E9.

- Provide a descriptive list of the main qualities (e.g., KSAs) needed for effective NCO performance for each target group.

Future Time Parameters

The Army's current selection criteria for first tour enlisted personnel are based on job analysis information that was gathered several years ago. In the meantime, the Army has experienced a number of changes, particularly in mission emphasis. This means that, in a very real sense, the future is already here. It is also true that forecasts of the future become especially tenuous the further out those forecasts are targeted. Therefore, this report includes four time horizons for identifying or forecasting job and person requirements for Army enlisted personnel:

- Baseline
- Army of Excellence (AOE)
- Army XXI (AXXI)
- Army After 2010 (AA2010)[2]

The "Baseline" is the name we gave to the performance information collected in Army studies during the late 1970s through the 1980s. The Army's current selection system is based on job analysis data collected during this time and therefore seemed to be the appropriate place to start for the current research. The latter three terms refer to eras that the Army is currently planning and developing.

The term "Army of Excellence" is used to describe the Army of the 1990s; an Army in transition between the cold war missions and the emerging geopolitical, post-drawdown missions. This Army is typified by having characteristics of both the "old" and the "new" in missions, technologies, organizations, training, and personnel. The AOE roughly corresponds to the period from Operation Desert Shield through about the year 2000. For this research, the AOE was used simultaneously as an indicator of emerging trends and a "starting point" for identifying performance requirements and predictors in the future eras.

The AXXI corresponds to the period from about 2000-2010. AXXI involves the digitization of the Army. It includes the production of new embedded systems and the upgrading of legacy systems to include digitization capability. Diverse missions and forces, and changing doctrine, different from those that characterized much of the AOE, also typify the AXXI.

Finally, the term "Army After 2010" is used to encompass the changes that will follow the completion of digitization, approximately between the years 2010-2025. Although the most speculative of the time periods, AA2010 is also unencumbered by restrictive evolutionary ties to the existing Army. It is currently the focus of many independent visionary efforts and initiatives within the Army to help define the expectations of that period.

The plans for AA2010 were evolving and changing during the course of this effort but one characteristic that remained constant was the idea that the AA2010 will be a hybrid force (Deputy Chief of Staff for Doctrine, 1998). In other words, it will consist of several different

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[2] This era was previously referred to as the Army After Next (AAN).

types of forces. One of these forces, called the "Battle Force," stood out because of the revolutionary technological changes that will have to occur between now and 2010 (approximately) for the Battle Force to become reality. The other forces that will make up the AA2010 are projected to be similar to current and AXXI forces (in terms of weapon systems and organization). Therefore, we chose to concentrate effort on identifying the unique performance requirements of the Battle Force. In studying AA2010 Battle Force plans, it appeared likely that non-prior service personnel would *not* be considered for this force. Battle Force personnel will more likely be selected from the ranks of experienced enlisted soldiers and NCOs. Consequently, we identified performance requirements and predictors for only one AA2010 target group (as opposed to three), the "Battle Force NCO."

Report Organization

This report represents the findings of a 12-month effort that simultaneously addressed requirements for Soldier21 and NCO21 research programs. The remaining discussions and data are organized into three main sections and numerous appendixes:

- *Methodology* – The methodology for this project was developed in Phase I of the Soldier21 study and is described in that final report (J. P. Campbell et al., 1998) and executed during this effort, Phase II. Although predicting future job requirements, especially as far into the future as 25 years, is a relatively untried process, the current approach is based in part on the elements of strategic job analysis described by Schneider and Konz (1989), and on the procedures for analyzing future jobs described by Arvey, Salas, and Gialluca (1992); Fogli, Goldberg, and Landis (1994); Knapp, Russell, and Campbell (1994); Knapp, Morath, Quaretti, and Ramos (1997); and Rumsey et al. (1998).

- *Results* – This section includes a presentation of the most important KSA results for current (AOE) target groups and future target groups: AOE and AXXI (first tour, junior NCO, mid-level NCO, and senior NCO) and AA2010 (Battle Force NCO). The findings are discussed in terms of input from military experts and psychologists who participated on expert panels, changes in KSA importance from one target group to another and one era to the next, existing assessment methods for KSAs, and possible application of selection procedures used by non-Army organizations.

- *Conclusions* – This section summarizes the results, presents a discussion on the overall implications of the findings, and suggests directions for future research and development efforts.

- *Appendixes* – The project yielded an abundance of information that will be useful in addressing future selection and promotion issues. The appendixes comprise the results of the analyses of two future eras, including (a) a discussion of global issues and conditions that may shape the Army of the future (2000-2025), (b) a comprehensive bibliography of current futures literature, (c) descriptions of future characteristics and the effects on Army job requirements, and (d) an overview of the current NCO promotion system.

METHODOLOGY

The approach to both the Soldier21 and the NCO21 projects was very similar—generate taxonomies of job performance requirements and predictors of performance (e.g., KSAs) for the current AOE and two future eras (AXXI and AA2010). Predictors were identified for five target groups (first tour, junior NCO, mid-level NCO, senior NCO, and Battle Force NCO). The designated performance domain was Army-wide components of the job, and the predictors required of all soldiers and NCOs, regardless of MOS.

Due to time and resource limitations, conducting a comprehensive occupational analysis of all current and future Army enlisted jobs (MOS) was out of the question. Furthermore, descriptions of future jobs did not exist. As a reasonable alternative, we *synthesized* taxonomies of future performance predictors by (a) identifying baseline performance requirements and predictors, (b) determining current performance requirements and predictors, and (c) augmenting current requirements with forecasts of future conditions and requirements. This methodological approach is illustrated in Figure 1. Establishing baseline performance taxonomies, particularly for specifying performance content, was accomplished by drawing from a voluminous amount of existing occupational data, training content specifications, criterion development research, task manuals, and "expert judgments."
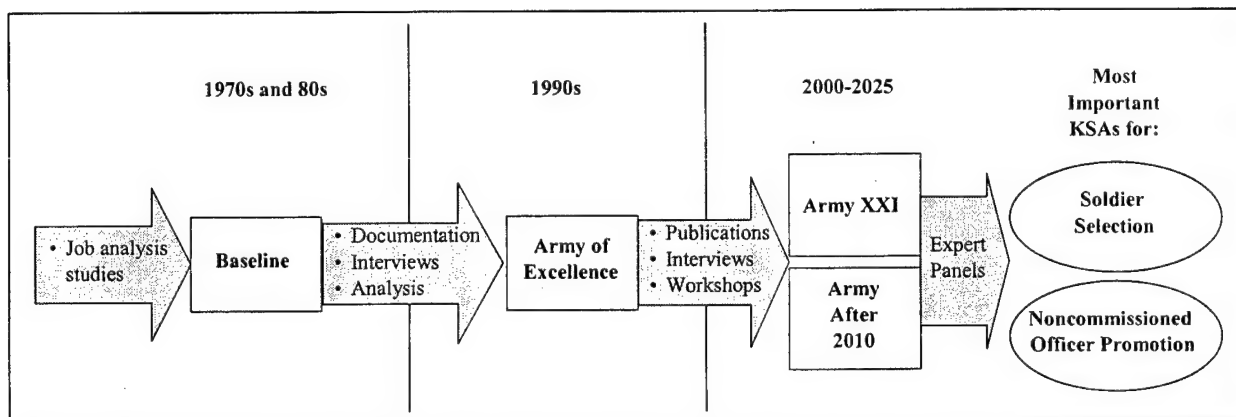
Figure 1. The basic methodological approach.

Forecasting future conditions began with an extensive review of futures literature at a broad, global level of inquiry. The result of this research effort, entitled "Factors that May Influence the Future Army: 2000-2025," is presented in Appendix A. As more was learned about the elements that would most directly affect first tour and NCO job requirements, the focus was narrowed to Army doctrine and organization projections (Force XXI and AA2010 reports), types of missions (e.g., increased Operations Other Than War), plans for systems development (e.g., Force XXI Battle Command, Brigade and Below [FBCB2]), technological advances (e.g., digital operations), and social culture (e.g., characteristics of future youth). Several methods were used to obtain this information: literature and Internet searches, Army publications, questionnaires, interviews with subject matter experts (SMEs), and workshops featuring panels of experts (Army SMEs and psychologists). A substantial bibliography of

futures literature and other sources (e.g., websites) were compiled in this process. This reference bibliography can be found in Appendix B.

In order to analyze specific jobs, missions, and technologies that were indicative of the future, a variety of Army organizations were visited. This allowed us to get first hand estimates of future conditions that may influence job requirements and the KSAs that will be required to fill future Army jobs. Descriptions of all of these procedures and how they were applied are presented in the following subsections:

- Establishing a Baseline Taxonomy
- Updating the Baseline: The Current Army of Excellence
- Analyzing Jobs, Missions, and Technology Indicative of the Future
- Determining the Most Important Future Performance Predictors

Establishing a Baseline Taxonomy

Baseline performance component and predictor taxonomies for this project were synthesized from existing information on Army enlisted jobs from such ARI selection and classification research projects as Project A/Building the Career Force (J. P. Campbell, 1987; J. P. Campbell & Zook, 1991, 1996), the Synthetic Validation Project (Wise, Peterson, Hoffman, Campbell, & Arabian, 1991), the Expanding the Concept of Quality in Personnel (ECQUIP) Project (Anderson et al., 1995), the Special Forces Project (Russell, Crafts, Tagliareni, McCloy, & Barkley, 1996), and previous NCO21 efforts (Rumsey et al., 1997; Rumsey et al., 1998). Another effort that we utilized to build baseline taxonomies was the Occupational Information Network (O*NET) Work Context Taxonomies (Peterson, Mumford, Borman, Jeanneret, & Fleishman, 1995; Peterson, Mumford, Borman, Jeanneret, Fleishman, & Levin, 1997). The most applicable findings from these studies are briefly discussed below.

Project A/Building the Career Force

Project A/Building the Career Force[3] was a large, personnel selection and classification validation project that was conducted over a 9-year period starting in 1982. A primary goal of the project was to develop a comprehensive set of performance measures for first tour soldiers, using a representative sample of jobs (MOS) that could be used as criteria against which to validate the existing predictors of performance (Armed Services Vocational Aptitude Battery [ASVAB]) and a battery of experimental predictors (J. P. Campbell, 1987). Some of the major research issues addressed in Project A revolved around:

- How to define and measure job performance.
- How to identify predictor domains with the highest potential for adding selection and classification validity to the existing ASVAB.
- How specific variables should be targeted to represent each critical domain for predictor development.

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[3] Project A and Building the Career Force were a continuum of the same longitudinal study. The entire study is referred to herein as "Project A."

- How performance measures should be aggregated into composites for validation purposes.
- How to choose optimal predictor batteries for different goals (e.g., maximizing performance vs. minimizing attrition).
- How to choose predictor batteries and estimate validity for MOS for which no empirical data could be obtained.

The current study addresses many of these same issues. Hence, the performance predictors and criterion measures identified in Project A compelled particular attention.

Entry-Level Predictor Domain

Project A researchers developed a fairly comprehensive set of predictor constructs that might be applicable for a wide range of entry-level enlisted jobs (J.P. Campbell, 1987). The predictor domain was depicted in a hierarchical manner, starting with 53 predictor constructs, organized into 21 clusters, which were in turn categorized into 8 factors. The eight factors included (a) cognitive abilities, (b) visualization/spatial, (c) information processing, (d) mechanical, (e) psychomotor, (f) social skills, (g) vigor, and (h) motivation/stability.

First Tour Performance Dimensions

Project A examined first tour and second tour (or NCO) performance criteria, both of which were relevant to our objectives. The Project A findings presented here refer to first tour soldiers, while NCO findings are presented in the following subsection. Critical incident analysis and task analysis were used to describe job content (C. H. Campbell et al., 1990).

Behaviorally anchored scale factors. A critical incident method was used to identify a basic set of performance factors describing "total job performance." J. P. Campbell (1987) described total performance as having two main factors, those with the same meaning and interpretation across all jobs (common) and those that are specific to a particular job (MOS-specific). Procedures were designed to identify both common and MOS-specific job factors as well as behaviorally anchored scales to measure them.

Most relevant to the Soldier21/NCO21 research were the Army-wide performance factors. Eleven Army-wide rating scales were developed along with an overall performance scale and an NCO potential scale, as shown in Table 2.

Table 2
Army-Wide Performance Dimensions Identified in Project A

1. Technical Knowledge and Skill
2. Effort
3. Following Regulations and Orders
4. Integrity
5. Leadership
6. Maintaining Assigned Equipment
7. Maintaining Living/Work Areas
8. Military Appearance
9. Physical Fitness
10. Self-Development
11. Self-Control
   - Overall Effectiveness—used to obtain an overall judgment of soldier effectiveness
   - NCO Potential—used to assess the likelihood that a soldier will be an effective NCO

Note. From "Improving the Selection, Classification, and Utilization of Army Enlisted Personnel: Annual Report, 1985 Fiscal Year," by J. P. Campbell (Ed.), 1987, ARI Technical Report 746, Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Common task dimensions. In developing rating scales to address the common task domain, task dimensions were formed by content analyzing tasks from the *Skill Level 1 Common Task Soldier's Manual* (J. P. Campbell, 1987). Because the manual specified tasks that all first tour soldiers were expected to be able to perform, it became the main source of Army-wide common task dimensions. Table 3 shows the 13 dimensions or "common task areas" that were derived from this source.

Table 3
Common Task Dimensions for Skill Level 1 from Project A

1. See: Identifying Threat (armored vehicles, aircraft)
2. See: Estimating Range
3. Communicate: Send a Radio Message
4. Navigate: Using a Map
5. Navigate: Navigating in the Field
6. Shoot: Performing Operator Weapon Maintenance (e.g., M16 rifle)
7. Shoot: Engaging Target with Weapon (e.g., M16)
8. Combat Techniques: Moving Under Direct Fire
9. Combat Techniques: Clearing Fields of Fire
10. Combat Techniques: Camouflaging Self and Equipment
11. Survive: Protecting Against NBC Attack
12. Survive: Performing First Aid on Self and Other Casualties
13. Survive: Knowing and Applying the Customs and Laws of War

Note. From "Improving the Selection, Classification, and Utilization of Army Enlisted Personnel: Annual Report, 1985 Fiscal Year," by J. P. Campbell (Ed.), 1987, ARI Technical Report 746, Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

NCO Performance Dimensions

Also developed in Project A were Army-wide job performance measures to assess second-tour soldiers (see Table 4). These measures, which were applicable to NCOs, were developed to describe the major differences between entry-level and higher level performance content. Since NCOs are responsible for performing tasks of all lower skill levels, as well as those at their current skill level, job analyses for first tour soldiers were used as a starting point and additional information was gathered to augment the NCO changes. In performance areas with the same general content, the major differences between first tour and NCO responsibilities were that difficulty and complexity increased at the NCO level. Dimensions new to the NCO level were supervisory and leadership responsibilities. Table 5 illustrates nine supervisory/leadership dimensions that resulted from a synthesis of expert judgments and cluster analysis (J. P. Campbell & Zook, 1991).

Table 4
NCO Army-Wide Performance Dimensions from Project A

1. Displaying Technical Knowledge and Skill
2. Displaying Effort, Conscientiousness, and Responsibility
3. Organizing, Supervising, Monitoring, and Correcting Subordinates
4. Training and Developing
5. Showing Consideration and Concern for Subordinates
6. Following Regulations/Orders and Displaying Proper Respect for Authority
7. Maintaining Own Equipment
8. Displaying Honesty and Integrity
9. Maintaining Proper Physical Fitness
10. Developing Own Job/Soldiering Skills
11. Maintaining Proper Military Appearance
12. Controlling Own Behavior Related to Personal Finances, Drugs/Alcohol, and Aggressive Acts

Note. From "Improving the Selection, Classification, and Utilization of Army Enlisted Personnel: Final Report on Project A," by J. P. Campbell & L. M. Zook (Eds.), 1991, ARI Research Report 1597, Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Table 5
NCO Supervisory/Leadership Dimensions from Project A

1. Planning Operations
2. Directing/Leading Teams
3. Monitoring/Inspecting
4. Individual Leadership
5. Acting as a Model
6. Counseling
7. Communication with Subordinates, Peers, and Supervisors
8. Training Subordinates
9. Personnel Administration

Note. From "Improving the Selection, Classification, and Utilization of Army Enlisted Personnel: Final Report on Project A," by J. P. Campbell & L. M. Zook (Eds.), 1991, ARI Research Report 1597, Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Synthetic Validation Project

For purposes of validating the ASVAB, Project A analyzed a representative sample of Army jobs (20 MOS out of approximately 270). These data provided the Army with a wealth of information on the performance determinants for those 20 MOS. In a Project A follow-on effort, the Army Synthetic Validation (SYNVAL) Project, the primary objectives were to utilize Project A information to evaluate synthetic validation techniques for determining MOS-specific composites for each MOS, and to evaluate alternative methods for setting minimum qualifying scores on each of these composites (Wise et al., 1991).

The SYNVAL project provided two approaches to categorizing soldiers' work. Both of these taxonomies cover the proficiency side of soldiers' work. One, the *Task Category Taxonomy*, was developed based on information gathered using the Army Task Questionnaire. Ninety-six task categories were divided into 17 dimensions. These dimensions were then collapsed into four major dimensions. The two highest levels of this taxonomy are seen in Table 6. The other taxonomy, the *Job Activities Taxonomy*, has 53 general activities grouped into 10 major categories (Peterson, Owens-Kurtz, Hoffman, Arabian, & Whetzel, 1990). The 10 job activity categories that were identified are listed in Table 7.

Table 6
Task Category Taxonomy from the Army Synthetic Validation Project

1. Maintenance
   - Mechanical Systems Maintenance
   - Electrical and Electronic Systems Maintenance
2. General Operation
   - Pack and Load
   - Vehicle and Equipment Operations
   - Construct/Assemble
   - Technical Procedures
   - Make Technical Drawings
3. Administrative
   - Clerical
   - Communication
   - Analyze Information
   - Applied Math and Data Processing
   - Control Air Traffic
4. Combat
   - Individual Combat
   - Crew-served Weapons
   - Give First Aid
   - Identify Targets

   - Supervision (this task dimension was not grouped in any of the four categories above)

Note. From "Army Synthetic Validity Project: Report of Phase III Results, Volume I," by L. L. Wise, N. G. Peterson, R. G., Hoffman, J. P Campbell, & J. M. Arabian, 1991, ARI Technical Report 922 Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Expanding the Concept of Quality in Personnel

Following the initiation of Project A, Robert Sternberg (1985) began writing about and discussing new kinds of predictors of job performance that he called Practical Intelligence and Tacit Knowledge. A number of other conceptual developments, such as the work by Bandura (1977) on self-efficacy, also suggested the need to examine whether the Project A predictors were sufficiently comprehensive. ARI followed up its work on NCO performance in Project A by developing and evaluating new predictors inspired by the work of Sternberg, Bandura, and others. That project, ECQUIP, had as its target the general performance of NCOs, not specific jobs (Peterson et al., 1993). The evaluation of new predictors required having a well-grounded performance space to predict. To start, a literature review identified 281 performance dimensions. Through statistical analyses of researchers' judgments, critical incident workshops with NCOs, NCOs' dimension ratings, and retranslation exercises, the original 281 dimensions were reduced to 13. The final job performance categories are listed in Table 8.

Table 7
Job Activities Taxonomy from the Army Synthetic Validation Project

1. Leadership/Teamwork
2. Communication
3. Use Information
4. Perceptual Judgments
5. Problem Solving/Trouble Shooting
6. Operate Equipment
7. Adjust and Control
8. Drive
9. Aiming
10. Physical Actions·

Note. From "Army Synthetic Validation Project, Report of Phase II Results, Volume I," by N. G. Peterson, C. Owens-Kurtz, R. G Hoffman, J. M., Arabian, & D. L. Whetzel, 1990, ARI Technical Report 892, Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Table 8
NCO Job Performance Categories from the Expanding the Concept of Quality in Personnel Project

1. Demonstrating Technical Knowledge and Skill
2. Communicating Orally
3. Writing
4. Demonstrating Effort and Initiative
5. Following Regulations, Policies and Procedures
6. Demonstrating Integrity and Discipline
7. Relating and Cooperating with Others
8. Motivating Others
9. Planning and Providing for Training
10. Directing, Monitoring, and Supervising Work
11. Organizing, Coordinating, and Executing
12. Demonstrating Responsiveness
13. Representing

Note. From "Expanding the Concept of Quality in Personnel: Base Period Final Report," N. G. Peterson, D. Smith, R. G. Hoffman, E. D. Pulakos, D. Reynolds, B. C. Potts, S. H. Oppler, & D. L. Whetzel, 1993, Washington, D.C.: American Institutes for Research.

Special Forces Job Analysis Project

One other system for categorizing job performance deserves examination—that coming out of work on U.S. Army Special Forces (SF). In 1996, Russell et al. described a job analysis of the SF job. The outcome included comprehensive lists and definitions of SF performance determinants and performance definitions. Because many similarities have been drawn between the SF and AA2010, the SF performance model was given close attention as a source of ideas for the current study (Sanders, Rumsey, & Brooks, 1997). The SF job analysis identified 47 predictors that were categorized into six areas: (a) General (e.g., Judgment and Reasoning); (b) Communication (e.g., Language Ability); (c) Interpersonal Skills, Motivation and Character

(e.g., Dependability); (d) Physical and Psychomotor (e.g., Physical Strength); (e) Interests (e.g., Interest in Skilled Trade); and (f) Conventional Army Experiences (e.g., General Soldiering Proficiency). In addition, 26 SF performance category definitions were identified. The performance categories are listed in Table 9.

Table 9
Performance Categories from the Special Forces Job Analysis

1. Teaching Others
2. Building and Maintaining Effective Relationships with Indigenous Populations
3. Handling Interpersonal Situations
4. Using and Enhancing Language Skills
5. Contributing to the Team Effort and Morale
6. Showing Initiative and Extra Effort
7. Displaying Honesty and Integrity
8. Planning and Preparing for Missions
9. Decision Making
10. Confronting Physical and Environmental Challenges
11. Navigating in the Field
12. Troubleshooting and Solving Problems
13. Being Safety Conscious
14. Administering First Aid and Treating Casualties
15. Managing Administrative Duties
16. Operating and Maintaining Direct-Fire Weapons
17. Employing Indirect Fire Weapons and Techniques
18. Employing Demolitions Techniques
19. Constructing for Mission-Related Requirements
20. Following Communication Procedures and Policies
21. Assembling and Operating Communication Equipment
22. Evaluating and Treating Medical Conditions and Injuries
23. Determining and Administering Medications and Dosages
24. Ensuring Standards of Health-Related Facilities, Conditions, and Procedures in the Field
25. Considering Subordinates
26. Providing Direction

Note. From "Job Analysis of Special Forces Jobs," by T. L. Russell, J. L. Crafts, F. A. Tagliareni, R. A. McCloy, & P. Barkley, 1996, ARI Research Note 96-76, Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Occupational Information Network

The Occupational Information Network (O*NET) is the U.S. Department of Labor's electronic database of occupational information that will replace the *Dictionary of Occupational Titles*. The O*NET currently structures the world of work into 1,122 occupational units (OUs). The development of a prototype model of OU information was the objective of a two-year research and development project sponsored by the Utah Department of Employment Security. The project published two reports: (a) the description of the specifications that were developed for the occupational information used to describe each OU (Peterson et al., 1995), and (b) the

analysis of data from field tests that used the variables specified by O*NET to analyze a sample of OUs (Peterson et al., 1997).

The O*NET model of occupational information includes nine domains, or taxonomies of variables, that can be used to describe an OU. One domain describes the major components of the work content, three describe the context or conditions of work, and five describe different taxonomies of individual differences that are potentially important for successful work performance. All nine domains are listed in Table 10.

Table 10
Occupational Information Network (O*NET) Taxonomies

Descriptions of Work Content
1.   Generalized work activities

Descriptions of Work Conditions and Context
2.   Work context
3.   Organizational context
4.   Occupational values (potential rewards that an occupation could provide)

Individual Job Requirements
5.   Basic and cross-functional skills
6.   Work-relevant knowledge areas
7.   Physical and cognitive abilities
8.   Education, training, and experience areas
9.   Work styles (i.e., personality dispositions)

Deriving the Baseline Performance Components and Predictors

The projects cited above produced a wide range of taxonomies and identified many potential indicators and predictors of performance. Because each project addressed specific needs during different time periods, there was a wide range of performance and predictor parameters. Project staff were faced with the issue of culling out relevant outcomes and applying them to the Soldier21/NCO21 requirements. This was accomplished through the following steps:

- Performance requirements and performance predictors were identified as being applicable to first tour soldiers, to NCOs, or to both. In most cases, the original source made this identification. However, for O*NET (which addresses a broad range of objectives for the civilian labor force) this determination was made by project staff familiar with both levels of enlisted performance.

- The goal for the Soldier21/NCO21 effort was to specify performance requirements or predictors that were distinct, but at a similar level of specificity. There was great variety in levels used throughout the different sources. For example, the O*NET model included 52 cognitive, spatial, psychomotor, and physical abilities, 33 knowledge domains, 42 general skills, 20 dimensions of work values, and 17 work styles. Categories from the taxonomies that were too "high" (or too "low") in the hierarchy were eliminated. Staff

psychologists reviewed and refined all of the performance and predictor definitions to ensure the resulting levels of specificity were similar.

- Another requirement of the Soldier21/NCO21 project was that the KSAs have Army-wide applicability. Hence, the specifications were reviewed for military relevancy. Since most of the sources were military projects, this relevancy could largely be assumed. However, some projects focused on MOS-specific dimensions, particularly in the case of Special Forces job analysis. Only dimensions that were applicable Army-wide were considered. At the same time, an Army SME on staff eliminated or updated specifications that had been rendered obsolete by changes in the Army since the time of the original projects.

- Performance descriptions and predictor definitions were reviewed for overlap and redundancies. Different sources sometimes used different terms to describe what was essentially the same specification. To avoid redundancy, the staff reviewed and compared all definitions. This step eliminated some and resulted in others being merged. The result was a "title" (e.g., Adaptability) and a "definition" (e.g., Responds adequately and effectively to changes in schedules and missions or tasks. Performs well when the unexpected occurs.) for each dimension. Many of these definitions were extracted from the source material. However, the staff revised each definition to accurately address the appropriate military level (first tour or NCO).

- Results were separated into job performance components and predictor sets. The language of each specification was refined to describe either (a) a performance component or, (b) a performance predictor.

- Composite lists were reviewed for completeness (i.e., to identify if there were any areas of performance for first tour or NCOs that were not covered). At the same time, knowledgeable staff also reviewed performance and predictor definitions to ensure that they met some minimal judgment of criticality (i.e., that they did not identify areas that were trivial or incidental to the job domain).

- Finally, each descriptor was edited for uniformity in language, descriptive level, and length.

This process was applied iteratively. The result was the baseline taxonomies of Army-wide job performance components (Table 11) and potential predictors (Table 12) for first tour soldiers. The NCO job components and predictors were combined in a single set (Table 13). Initial reasoning for combining them was that potential NCO promotion criteria could be based on current job performance, which would also serve as predictors of future performance. However, job component and predictor sets were eventually separated for the future eras (AXXI and AA2010) so that the first tour and NCO sets could be more easily compared. Separating them also allowed the subsequent expert panel participants to consider potential predictors as a separate activity from their consideration of performance requirements.

Table 11
Baseline Performance Components for First Tour Soldiers

- **Common Tasks**. Masters and performs technical common tasks designated skill level (SL) 1 including land navigation, rifle and machinegun maintenance and proficiency, field survival techniques, nuclear, biological, and chemical (NBC) protection, and first aid.

- **Military Occupational Specialty (MOS) Technical Proficiency**. Performs the entry-level (SL 1) job-specific tasks required of his or her MOS. Demonstrates proficiency in skills taught in Advanced Individual Training (AIT) for the job and learns, applies, and refines skills during on-the-job-training (OJT) during his or her initial unit assignment.

- **Effort and Initiative**. Does whatever is required to get the job done. Puts forth extra hours of work or is able to overcome difficulties and adversities to get the job done.

- **Regulations and Orders**. Follows written regulations, orders, unit standing operation procedures (SOP), customs of the service, and instructions issued by superiors. Quickly reacts to implement supervisors' and superiors' orders and directions.

- **Integrity**. Adheres to honest and trustworthy behavior in both job related and personal matters. Admits and takes responsibility for own actions. Does not try to avoid work assignments or responsibilities. Is trustful with property of others.

- **Leadership**. Performs in a leader role when required. Fills in when a noncommissioned officer or a superior soldier is absent.

- **Military Appearance**. Dresses properly and neatly in the specified uniform. Projects a positive military image in all public appearances in uniform. Shows pride in the uniform, unit, and service.

- **Physical Fitness**. Meets the Army standards for weight, physical fitness, and strength. Maintains health and fitness to meet deployability and field requirements as well as the physical demands of the daily job.

- **Self-Development**. Seeks to develop soldier, job, and personal skills by participating in study, training, classes, reading, or education. Takes advantage of opportunities for self-improvement offered by the Army and civilian sources.

- **Self-Control**. Controls temper, anger, and inappropriate aggressiveness. Practices moderation in personal habits and behaviors. Avoids behaviors that are self-destructive or dangerous to others.

- **Computer Skills**. Uses personal computers (non-specialized) and software programs. Creates and maintains computer files. Locates and utilizes information on the world wide web (www) and uses other Internet functions including e-mail.

Table 12
Baseline Predictors of First Tour Performance

- **Judgment and Decision Making**. Reacts to new situations by applying learned principles and experiences. Uses common sense and reason in determining actions in a situation.

- **Adaptability**. Responds adequately and effectively to changes in schedules and missions or tasks. Performs well when the unexpected occurs.

- **Ingenuity**. Applies novel solutions to problems to get the job done when standard solutions don't work. Is able to "work outside the box" when required but does not do so in a way that creates problems or turmoil.

- **Basic Math**. Knows and applies addition, subtraction, multiplication, division, and simple mathematical formulas.

- **Reading**. Understands written performance instructions, operator's manuals, basic textbooks, letters of instructions, written orders, and job directives.

- **Writing**. Communicates thoughts, ideas, and information successfully to others by writing. Uses proper sentence structure including grammar, spelling, capitalization, and punctuation.

- **Oral Communication**. Conveys thoughts, ideas, and information to supervisors, other soldiers, and civilians through speech. Is understood by others with whom the soldier must interact on the job.

- **Persuasiveness**. Is able to get others to see his or her viewpoint and to convince others to react and interact favorably.

- **Stability**. Maintains even and levelheaded behavior in stressful situations. Is able to effectively perform the job under conditions of mental or emotional stress.

- **Teamwork**. Cooperates effectively with others to get the job done. Works well as a member of a group in both formal and informal, job and non-job situations.

- **Dependability and Autonomy**. Is responsible and loyal to the unit and to the requirements of the job. Can be expected to follow though on his or her duties or requirements with little or no supervision. Is self-confident, self-sufficient, and comfortable when working alone.

- **Moral Courage**. Acts on own convictions despite the consequences. Does not succumb to peer pressure to commit prohibited, harmful, or questionable acts.

Table 13
Baseline Performance Components and Predictors for NCOs

- **Military Occupational Specialty (MOS) Knowledge and Skill.** Possesses sufficient technical knowledge to perform effectively in own MOS. Keeps informed of the latest developments in field. Shows competency in performing various job tasks.

- **Safety Consciousness.** Is alert to safety at all times. Follows safety guidelines and instructions for weapons and equipment, as required. Monitors others to ensure compliance with standing operating procedures (SOP) when using weapons or dangerous equipment.

- **Oral Communication.** Speaks in a clear, organized, logical manner. Pays attention to others and responds in suitable manner. Keeps others informed as necessary. Presents competent, understandable, and organized briefings and presentations.

- **Writing.** Prepares written materials that are organized, logical, accurate, and contain relevant information. Uses language that is at an appropriate level for the audience. Uses correct grammar, punctuation, and spelling. Produces written materials that require little or no editing.

- **Computer Skills.** Uses personal computers (non-specialized) and software programs. Creates and maintains computer files. Locates and uses information on the world wide web (www) and uses other Internet functions including e-mail.

- **Effort and Initiative.** Persists with high effort in completing work. Takes independent action when necessary. Seeks out and willingly accepts responsibility, extra work, and challenging assignments. Conducts own work carefully, completely, and accurately. Persists in carrying out difficult assignments and follows through on assignments and responsibilities.

- **Regulations, Policies, and Procedures.** Follows prescribed procedures in carrying out duties and assignments. Adheres to policies and regulations. Consults appropriate manuals or regulations to ensure that proper procedure is followed. Accepts others' authority and follows orders. Observes the chain of command.

- **Integrity and Discipline.** Maintains high ethical standards. Behaves in a correct, moral, and ethical manner. Provides an accurate accounting of information (i.e., does not intentionally distort information). Demonstrates trustworthiness. Controls self-indulgence.

- **Relating to and Leading Others.** Treats others in a courteous, diplomatic, and tactful manner. Provides help and assistance to others. Uses good judgment in dealing with subordinates (e.g., counsels and disciplines). Acts as a role model. Works effectively as a team member and as a team leader.

- **Motivating Others.** Recognizes, encourages, and rewards effective job performance. Submits paperwork necessary for awards, disciplinary actions, and performance reviews. Corrects unacceptable conduct. Uses disciplinary actions constructively.

- **Basic Math.** Knows and applies addition, subtraction, multiplication, division, and simple mathematical formulas.

- **Training Others.** Evaluates and identifies training needs. Institutes formal or informal programs to address training needs. Ensures that training opportunities are provided to soldiers. Develops others by providing work experiences. Guides and assists subordinates on technical matters. Demonstrates work task procedures.

(table continues)

Table 13 (continued)

- **Common Skills**. Masters and performs technical common tasks designated for skill levels two through four (SL2-4) including the functions of land navigation, field survival techniques, and nuclear, biological, and chemical (NBC) protection. Conducts dismounted field tactical offensive and defensive operations at the squad and platoon level.

- **Directing, Monitoring, and Supervising Work**. Assigns and delegates tasks to subordinates fairly for efficiency and effectiveness. Correctly evaluates subordinates' strengths and weaknesses so as to assign work properly. Sets goals, targets and criteria for work and assignments. Ensures that assignments are clearly understood.

- **Organizing, Coordinating, and Executing**. Plans and coordinates work to accomplish objectives. Takes information into account when deciding on a course of action. Identifies potential problems or sources of problems and develops sound solutions.

- **Judgment and Decision Making**. Reacts to new situations by applying learned principles and experiences. Uses common sense and reason in determining actions in a situation. Makes reasoned and thoughtful decisions in the job context.

- **Cultural Adaptability**. Demonstrates tolerance and understanding of other cultures and value systems in dealing with soldiers and civilians in the job situation. Seeks to understand other cultures' beliefs and customs. Modifies own behavior to adapt to different cultural situations.

- **Adaptability**. Modifies behavior or plans as necessary to reach goals. Is able to maintain effectiveness in varying environments with various tasks, responsibilities, or people. Demonstrates openness to change.

- **Military Presence**. Presents a positive and professional image of self and the Army even when off duty. Shows pride in being a soldier. Maintains proper military appearance. Acts as an effective role model. Willingly represents the Army at community and social functions.

- **Information Gathering**. Knows how to find information. Identifies essential information.

- **Multilingual**. Speaks, reads, or understands more than one language. Has aptitude to learn new languages.

- **Physical Fitness**. Meets the Army standards for weight, physical fitness, and strength. Maintains health and fitness to meet deployability and field requirements as well as the physical demands of the daily job.

- **Conflict Resolution and Negotiation**. Handles complaints, arbitrates disputes and resolves grievances and conflicts, or otherwise negotiates with others.

- **Administrative Management**. Keeps accurate, up-to-date, organized records. Processes paperwork in a timely fashion.

Updating the Baseline to the Current Army of Excellence

While the sources discussed above provided a comprehensive array of job requirements and predictors, some of those studies were dated and others did not have a specific Army-wide or NCO orientation. It was therefore necessary to confirm and update the baseline lists. To do this, a visit was arranged with the U.S. Army Sergeants Major Academy (USASMA) at Fort Bliss, Texas where access to students at the Sergeants Major Course (SMC) was provided by Academy

staff. Project staff conducted a series of four workshops with 40 SMC students. All participants were either at the rank of E9 or were on the promotion list for E9. Participants had a mean time-in-service of 21 years and represented 21 different MOS. The objective was to update the baseline lists we had developed to be relevant for the current AOE.

The USASMA workshop participants considered the requirements for first tour soldiers separately from the NCO requirements. For first tour soldiers, participants were given both a list of the baseline job requirements (components) and a list of baseline predictors (see Tables 11 and 12). Both job requirement and predictor lists included a description or definition as part of the list. For NCO requirements, a single list of job performance requirements was provided (see Table 13). To make the lists suitable for the current Army of Excellence, participants were instructed to add, delete, or modify any of the existing items on their own. Then, proposed changes were discussed by the group and an effort was made to get group consensus on changes (although individual changes were accepted if group convergence could not be obtained). Care was taken to ensure that proposed changes applied Army-wide and were not MOS specific.

Participants were also asked to provide an importance rating for each job requirement and predictor using a 5-point scale. Mean importance ratings were calculated and used to obtain a comparative ranking of the top job requirements and predictors. The rankings for first tour requirements and predictors are in Table 14 and NCO job requirements/predictors are in Table 15. They were used as a guide during subsequent revisions to the job requirements and attributes list.

Also, an important detail was raised during the importance rating exercise for the NCO job requirements. Many participants pointed out that the singular category "NCO" was too broad to be meaningful; that while most of the job requirements presented were relevant across NCO skills levels, they varied in importance and significance at different stages in an NCO's career. This input resulted in the subsequent decision to define NCO performance domain into three target groups, as discussed in the Introduction.

Project staff used the input from the USASMA workshops to develop lists of job performance requirements and predictors applicable to the AOE era. The actual item changes from the baseline lists were few. For first tour job requirements, participants suggested adding "Vehicle Operation/Driving" and "Financial Management." From the same list, they suggested deleting "Computer Skills" and "Leadership" explaining that these were not responsibilities currently associated with first tour soldiers. Suggestions for modifying the first tour predictor list were to add "Discipline" and "Initiative" and to drop "Persuasiveness." For the NCO list (which included a combination of job requirements and predictors), even fewer revisions were specified: add "Counseling" and delete "Multilingual."

The USASMA workshop suggestions were carefully considered and discussed among the project staff and the ARI staff. Although actual item changes were few, the input was used to revise many of the content definitions associated with a job component or predictor term. For example, it became apparent from the workshops that words such as *discipline, initiative,* and *counseling* are important to the NCO community, so definitions were revised to ensure these specific terms were included.

Table 14
The Rank Order of AOE Job Requirements and Predictors of Performance for First Tour Soldiers

Rank	Job Performance Requirement	Mean Importance Rating (n=40)
1.5	Physical Fitness	4.20
1.5	Common Tasks	4.20
3	MOS Technical Proficiency	4.10
4	Integrity	4.05
5	Regulations and Orders	3.80
6	Self-Control	3.50
7	Effort and Initiative	3.28
8	Military Appearance	3.13
9	Self-Development	3.00
10	Leadership	2.55
11	Computer Skills	2.10

Rank	Predictor	Mean Importance Rating (n=40)
1	Teamwork	4.10
2	Dependability and Autonomy	3.97
3	Moral Courage	3.79
4	Reading	3.74
5	Adaptability	3.69
6	Oral Communication	3.46
7	Judgment and Decision Making	3.44
8	Stability	3.37
9	Writing	3.28
10	Basic Math	3.08
11	Ingenuity	2.95
12	Persuasiveness	2.36

Note. MOS = military occupational specialty. The rating scale went from 0 to 5 where 0 was "Not at all important," 1 was "Much less important compared to most others," 2 was "Less important compared to most others," 3 was "About the same importance as most others," 4 was "More important compared to most others," and 5 was "Much more important compared to others."

Table 15
Rank Order of Job Predictors/Requirements for NCOs

Rank	Job Performance Factors	Mean Importance Rating (n=40)
1	Integrity and Discipline	4.40
2	Judgment and Decision Making	4.32
3.5	Training Others	4.28
3.5	Directing, Monitoring and Supervising Others	4.28
5	MOS Knowledge and Skill	4.27
6	Motivating Others	4.21
7	Oral Communication	4.20
8	Organizing, Coordinating, and Executing	4.17
9	Physical Fitness	4.15
10	Relating to and Leading Others	4.13
11	Safety Consciousness	4.00
12.5	Writing	3.97
12.5	Common Skills	3.97
14	Effort and Initiative	3.92
15.5	Regulations, Policies, and Procedures	3.87
15.5	Conflict Resolution	3.87
17	Military Presence	3.77
18	Adaptability	3.65
19	Information Gathering	3.62
20	Administrative Management	3.52
21	Cultural Understanding	3.45
22	Basic Math	3.27
23	Computer Skills	2.97
24	Multilingual	1.70

Note. MOS = military occupational specialty.

Analyzing Jobs, Missions, and Technology Indicative of Future Army Jobs

In order to define job requirements of the future, the step preceding identification of future KSAs, we needed to learn as much as possible about the conditions in which future soldiers will operate. One way to do this was to review and analyze futures era literature. But, as the review of the literature proceeded, it became evident that there were many future characteristics, particularly of the Army XXI era, that were being experienced in some MOS and units in the current Army. The decision was not to do a specific job analysis of these chosen jobs but to use them as a vehicle to explore trends that were likely to affect the entire Army in the future. By necessity, this approach was limited to a very few jobs; time and other resources would not allow a wide sampling. In the end, three MOS were selected: 95B (Military Police), 19D (Calvary Scout), and 31U (Signal Support Systems Specialist). Consequently, we visited proponent school

locations for each of these jobs (Fort McClellen, Alabama; Fort Knox, Kentucky; and Fort Gordon, Georgia, respectively). We conducted workshops with more than 45 persons, including incumbent and supervisory NCOs, civilians, and officers at the Directorate and General Officer level. These MOS and their relevancy to future Army-wide performance requirements are discussed below:

- MOS 95B (Military Police): This MOS reflects what Army forecasters see as the missions of the future including peacekeeping, disaster assistance, population control, counter-terrorism, and quasi-combat situations. Additionally, military police operate in small groups, sometimes with minimal supervision and in non-hierarchical modes of employment. These are characteristics that were identified for the future eras.

- MOS 19D (Cavalry Scout): Cavalry Scouts are combat soldiers who are given a wide variety of missions. In their reconnaissance and surveillance role, they operate in small groups, far removed from the main forces. They employ a variety of high tech surveillance and reporting equipment and serve as enablers of a variety of combat systems including direct and indirect fires, close air support, and unmanned aerial vehicles (UAVs). Their potency lies in their versatility. As such, they too reflect many of the characteristics of 21st century soldiers and NCOs.

- MOS 31U (Signal Support Systems Specialist): This MOS and related MOS 74B (Information Systems Operator-Analyst) deal with operation and maintenance of high tech signals, automation, and computer equipment. The 31U job involves installation, employment, and maintenance of a wide variety of complex signal equipment including commercial, off the shelf computers. The 74B is the computer network system administrator. This is forecast to be one of the highest-demand MOS to ensure the proper integration and maintenance of the Army's digital equipment.

Besides examining this small sample of future-oriented MOS, we also profiled and interviewed civilians, soldiers, NCOs, and officers who were developing future doctrine, participating in peacekeeping missions, using advanced or experimental technology, or were otherwise engaged in activities that gave them particular insights into future performance requirements or KSAs. Below is a list of Army offices or units where individuals were interviewed. A short synopsis explaining the relevance of each site visit is also provided. Before each visit, we researched the mission of the unit or office. A set of interview questions was then prepared that focused specifically on the activities of that site. For instance, questions developed for senior NCOs and officers of the 2nd Armored Calvary Regiment, a unit that had recently returned from a peacekeeping deployment in Bosnia, focused on the types of skills soldiers needed to be successful in the mission and the characteristics of soldiers who performed best. Using the questions as a guideline, informal discussion sessions, generally lasting several hours, were conducted.

- Headquarters, Training and Doctrine Command (HQ, TRADOC), Future Battle Directorate/Proponent for AA2010 (Fort Monroe, Virginia). This is the TRADOC staff responsible for the development and progression of what the Army is headed towards in the period 2010 – 2025. We made an on-site visit with the AA2010 staff in February 1999 and maintained a continuous liaison with them throughout the course of the study. This facilitated an understanding of the AA2010 that would not have been possible otherwise.

- HQ, TRADOC Joint Venture Directorate (Fort Monroe, Virginia). This TRADOC office has the responsibility for coordination of the Army Experimentation Concept Plan (AECP), including scheduled Advanced Warfighting Experiments (AWE) and Advanced Warfighting Demonstrations (AWD). The deputy director explained Joint Venture's role in the AECP and its supporting AWE/AWD, vital components of the AXXI implementation plan.

- HQ, TRADOC Futures Training Directorate (Fort Monroe, Virginia). As coordinator of TRADOC's AXXI training initiatives and innovations, this Directorate provided vital input to understanding AXXI. This site visit included discussions involving many facets of the training development arena (e.g., collective training, individual training). More than a dozen people, including contractors, officers, and TRADOC civilian staff, provided input.

- HQ, 4th Infantry Division (ID) (Fort Hood, Texas). The 4th ID has been designated the Army's "first digital division" and was the unit that conducted all of the AXXI digitization AWEs starting in 1996. We interviewed staff NCOs and operators who had actual experience in digital operations.

- Digital Force Coordination Cell (DFCC) (Fort Hood, Texas). This group of officers, NCOs, civilians, and contractors oversees all of the experimentation regarding digitization at Fort Hood. They coordinate on many levels for AWE/AWD and are in a unique position to experience and interpret trends resulting from operating in digital environments. The director of the DFCC provided important insights into the issues faced by digital units, including recruiting and training the most capable soldiers.

- Central Technical Support Facility (CTSF) (Fort Hood, Texas). The CTSF trains individuals and staffs to function digitally. They provide operator level instruction on equipment and collective training on operating as a digital staff for staff officers and NCOs. We interviewed two analysts from the contractor staff at CTSF who develop and implement training for digital staffs and discussed the implications of operating in a digital environment.

- U.S. Army Recruiting Command (USAREC) (Fort Knox, Kentucky). A civilian representative from the Program Analysis and Evaluation department provided input on current and future recruiting initiatives and granted us access to numerous reports on USAREC-sponsored studies of future issues.

- USASMA. The staff at USASMA has proponency for much of the NCO educational system (NCOES) direction and development. They also provide a measure of the "pulse" of the NCO world and current thinking and expectations. Interviews were conducted with key personnel.

- The Mounted Maneuver Battlespace Lab (MMBL) (Fort Knox, Kentucky). The MMBL is conducting a series of command and control (C2) reengineering experiments exploring implications for future battle staffs in the digital age. These experiments should have direct implications for the Strike Force concepts. During a site visit we were able to view prototype C2 software and hardware and conduct interviews with contractor personnel supporting the experiments.

- 2nd Armored Cavalry Regiment (ACR) (Fort Polk, Louisiana). Elements of the 2nd ACR had returned from a nine-month peacekeeping tour in Bosnia shortly before we visited the unit in March 1999. The 2nd ACR also had participated as a force in the mission in Haiti in 1997. Both of these experiences are indicative of AXXI type missions. The visit afforded a series of interviews with officers and NCOs on all levels. The visit provided insights not only on unit participation in such missions, but on the preparations and post-mission operations as well.

- 4th Air Defense Artillery Battalion (ADA Bn), 1st Cavalry Division (Fort Hood, Texas). The 4th ADA Bn is a combat support unit that has deployed several times in recent years. We interviewed 15 experienced NCOs (E6 and higher). Discussion topics ranged from technology and training to soldier discipline and recruiting (several interviewees had completed recruiting assignments). The NCOs were forthcoming and candid about the issues facing a unit frequently called upon to support combat and non-combat missions.

A valuable outcome from the site visits was the extensive number of individual contacts made. This was a significant requirement for the final step in our process of identifying the most important KSAs for AXXI and AA2010. The make-up of the Army SME Panel, detailed in the following subsection, came largely from individuals identified during these visits. All told, we met with in excess of 100 persons during these visits. Their insights provided a depth of understanding about the Army of the future that would have been unobtainable by literature searches alone. Participants were uniformly helpful and only the magnitude of the participation precludes crediting participants individually.[4]

Once the site visits were complete, project staff analyzed the diverse and extensive aggregation of data. The information was processed based on its relevancy to doctrine, training, leader development, organization, materiel, and soldiers (DTLOMS). When added to the information that had been gathered through literature searches and other methods, the culmination was filtered, categorized, and refined into two products: (a) a description of forecasted AXXI conditions, and (b) a description of forecasted AA2010 conditions. Depictions of these eras are provided in Appendix C. The descriptions include forecasts of future DTLOMS and inferences of Army-wide job components for each era.

Determining the Most Important Future Performance Predictors

The final step in the methodology was to collect and summarize expert judgments regarding the relative importance of future KSAs. The panels provided another layer of expert judgment in identifying the most critical KSAs of future eras. More specifically, three panels were organized to provide feedback on the accuracy of the future forecasts and the relative importance of predictors that had been identified for future job requirements: an Army SME Panel, a Psychologist Panel, and a Project Staff Panel. Tasks given to the panels included providing feedback on the accuracy of the future forecasts, judging the relative importance of predictors identified for future job requirements, and resolving differences between panels.

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[4] We are indebted to the organizations cited above. However, we must stress that any interpretations of information provided and errors that might be present are solely the responsibility of the study staff. The contents of this study do not reflect any endorsement or official sanction of the groups or organizations listed.

Army Subject Matter Expert Panel

A panel of nine Army SMEs was assembled for a two-day workshop on May 26-27, 1999. The panel comprised mainly active duty Army senior NCOs and officers who had participated in the site visit interviews discussed above. There was at least one representative from each of the following Army organizations: the Future Battle Directorate, USASMA, the Military Police (MP) Center, TRADOC, the Signal Center, U.S. Army Personnel Command (PERSCOM), DFCC, Office of the Deputy Chief of Staff for Personnel (DCSPER), and the Fort Knox U.S. Army NCO Academy.

Participants were presented the future forecasts (DTLOMS, future characteristics, and forecasted job requirements—see Appendix C). They were also supplied with the job component and predictor lists that had been developed for the AOE. The objectives for the Army SME Panel were to:

1. Revise descriptions of future characteristics and requisite job components according to their knowledge and expertise regarding future conditions (Baseline lists, see Tables 11-13, were used as stimuli, starting points for defining future job components and KSAs.)

2. Identify predicators using the AOE list as a starting point (or identify new ones) that will be needed to accomplish the future job requirements.

3. Define the differences between junior, mid-level, and senior NCOs using the NCO job components and predictors.

4. Verify that the job requirements and predictors are appropriate for each target group.

5. Rank order the predictors by importance for each target group.

6. Do all of the above for three eras: AOE, AXXI and AA2010.

The workshop began with a series of briefings to orient the panel to the project goals, the future Army eras, and the goals of the workshop. After allowing the panel to study the job components and predictors that had been identified for the AOE, each participant was provided a packet of 3x5 inch index cards that had the predictors (with definitions) printed on them. Each panel member was instructed to choose the most important predictors for the current AOE (eight for first tour soldiers and 10 for each of the NCO target groups). Each panelist read their top choices aloud as a staff facilitator recorded them on the whiteboard so all could see. The top eight (10 for the NCO target groups) predictors receiving the most votes were designated as the "first tier" (ties were broken by consensus). Each participant then individually ranked the first tier predictors on a worksheet, listing the most important predictor as one, the second most important as two, and so on.[5] The SMEs were also asked to choose and record a second tier of predictors (the "next" most important) from the predictor set (minus the first tier). The panel members recorded their choices for the second tier on their worksheets.

The panel was then divided into two groups: an "AXXI group" and an "AA2010 group." Each group received written descriptions and an extensive briefing from a member of the project

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[5] Consensus rankings for the "first tier" were calculated by multiplying the rank position by the number of votes at each rank and dividing by the total number of voters (SMEs).

staff on the conditions of the future era. The groups were instructed to carefully review the future characteristics and job components that had been compiled. Suggestions were gathered from the SMEs as to what revisions should be made to these materials and how the change might affect the job components and predictors for that era.

On the second day of the workshop, project staff summarized the characteristics of each era and the modifications that were made to job components. The panelists reviewed and discussed the predictors of future performance and then completed several ranking exercises. As described above, the Army SMEs chose and ranked the top 8 predictors for AXXI first tour soldiers and the top 10 predictors for AXXI junior, mid-level, and senior NCOs, and AA2010 Battle Force NCOs. In all, five ranking exercises were conducted.

Psychologist Panel

On July 13-14, 1999, an expert panel of 10 psychologists with knowledge of Army requirements was assembled in a workshop format to review the AXXI and AA2010 job components and make recommendations regarding the predictors that had been modified by the Army SME Panel. While we relied on the Army SME Panel to revise the job components and recommend relevant predictors from the AOE list, the psychologists (most were I/O specialists) had particular expertise to recommend and rank the most important performance predictors with respect to the future job components presented.

After comprehensive briefings on AXXI and AA2010, the Psychologist Panel chose and ranked a first tier of predictors, based on importance, for each era using the ranking procedure described above. For choosing a second tier, the procedure was modified slightly. Each psychologist nominated predictors for the second tier—nominations were posted for all to see, and a consensus vote was taken to determine the final second tier predictors. This step alleviated having several predictors tied for inclusion in the second tier. Seven second tier predictors were identified for first tour and five were identified for each NCO target group.

The ranking results were calculated and presented along with the results from the SME Panel. The second day of the workshop opened with a discussion of the differences and similarities in the ranking results between the two panels. The psychologists offered insights and explanations as to these differences. Several project staffers recorded the discussion.

The final activity of the workshop began with a briefing on the current selection and promotion systems. Project staff had prepared several items that the psychologists were asked to comment upon based on their expertise and understanding of the current Army enlisted selection and promotion systems. These items included (a) a list of criteria that can be used to evaluate assessment instruments or technologies, (b) a list of factors that bear on the feasibility of introducing changes to the Army's selection and promotion systems, and (c) a summary of innovative measurement methods that might be used to assess some of the critical future KSAs identified in this research. The lists and summary were based on project staff expertise, literature reviews, and phone interviews with assessment experts (they are described more thoroughly in the Results section). Based on the input of the Psychologist Panel, these lists were revised and finalized.

Final Staff Panel

The final workshop was conducted on July 28, 1999 to reconcile the differences between the Army SME and Psychologist Panels. The Staff Panel consisted of eight researchers from the project staff and psychologists from ARI's Selection and Assignment Research Unit. The synthesis of the two sets of importance orderings from the Army SME Panel and the Psychologist Panel was accomplished by establishing an algorithm for combining these two sets of judgments. The following outlines the final rules for resolving panel differences.

There was no attempt to rank order all first tour KSAs or all NCO KSAs. Instead, a rank ordering was generated only for the very highest priority subset. After that, KSAs were prioritized in "blocks" as defined below. KSAs were not ordered by importance within blocks.

1. The highest priority subset comprised those KSAs that both panels had placed in the top 8 (First Tour) or top 10 (NCOs). This top tier ranged from three KSAs (Battle Force NCO) to seven KSAs (Army XXI Junior NCO). The KSAs in this top tier were also rank ordered by computing the average rank across both sets of judges.

2. The second block (KSAs are unranked within the block) was defined as all KSAs placed in the top tier by one panel and the second tier by the other panel.

3. The third block was defined as all KSAs placed in the top tier by one panel and those tied for inclusion in the second tier by the other panel.

4. The fourth block was defined as all KSAs placed in the top tier by one panel and in the third tier by the other panel. The third tier always consists of those KSAs that were not ranked in the top tier and were not nominated for the second tier.

5. The fifth block was defined as all KSAs placed in the second tier by both panels, but not included in the ties for the last spot in the second tier. For example, if the frequency counts for one panel's NCO second tier nominations yielded two KSAs tied for the fifth (i.e., last) spot, neither KSA was included in this fifth block.

6. The sixth block was defined as all KSAs nominated for the second tier by one panel and tied for the last spot in the second tier nomination for the other group.

7. The seventh block was defined as all KSAs that were nominated for the second tier by one panel (including all ties for the last spot) but were left in the third tier by the other group.

8. The eighth and last block was defined as all KSAs that were not in the top tier or nominated for the second tier by either panel.

The outcomes of this prioritization are presented in the next section.

RESULTS

The results of applying the methodology previously described are provided in this section. First we discuss the identification of critical KSAs for each of three eras: AOE, AXXI, and AA2010 Battle Force NCOs. We contrast the future KSA priorities to the critical AOE KSAs identified by the Army SME Panel. We also compare the predicted future critical KSAs identified by the first two panels (the Army SMEs and the psychologists) and present a consolidated portrayal of the future KSAs for the various target groups (AXXI first tour; AXXI junior, mid-level, and senior NCOs; AA2010 Battle Force NCOs) put together by the third panel (Staff Panel).

In order to assist the Army in making use of the future KSA priority information, the last part of this section discusses issues related to assessment. The discussion begins with a review of current Army enlisted selection and promotion systems, continues with a discussion of considerations bearing on the usefulness and feasibility of new assessments that might be incorporated into those systems, and ends with a summary of measurement approaches that might be used to measure future critical KSAs.

Identification of Critical Knowledges, Skills, and Abilities

The potential KSAs that could be important predictors of performance are shown in Tables 16 and 17. Table 16 is the array of potential predictors of first tour soldier performance in both the current Army (AOE) and the AXXI era. (Recall that first tour soldier requirements for AA2010 were not investigated.) Table 17 is the array of potential predictors of NCO performance in all three eras (AOE, AXXI, AA2010). These are the lists of KSAs from which the Army SMEs and psychologists elected the most critical KSAs for each of the target groups.

KSAs that appear for the AOE era were developed based on previous research and the input of the USASMA workshop participants described earlier. Some of the KSAs on the AXXI and AA2010 lists were identified by the Army SME Panel prior to conducting the KSA ranking exercises. These new KSAs were viewed as being potentially relevant to one or both future eras, but not relevant for most AOE enlisted personnel.

In general, the KSAs in each array fell into the following categories:
- Cognitive, spatial, psychomotor, or physical aptitudes.
- General dimensions of knowledge and skill (e.g., oral communication skill).
- Army-specific knowledges and skills (e.g., MOS specific technical skill, leading and motivating skill).
- Attitudes and values.
- Characteristic dispositional or behavioral tendencies (e.g., to be dependable or exhibit high energy and effort).

Table 16
KSA Definitions for First Tour Job Performance

Predictors of First Tour Job Performance

- **Writing Skill.** Communicates thoughts, ideas, and information successfully to others through writing. Uses proper sentence structure including grammar, spelling, capitalization, and punctuation.

- **Oral Communication Skill.** Speaks in a clear, organized, and logical manner.

- **Reading Skill.** Understands written instructions, operator's manuals, basic textbooks, letters of instructions, written orders, and job directives.

- **Basic Math Skill.** Knows and applies addition, subtraction, multiplication, division, and simple mathematical formulas.

- **Basic Electronics Knowledge.** Knows general information regarding electronics principles and electronics equipment operation and repair.

- **Basic Mechanical Knowledge.** Knows general information regarding mechanical principles, tools, and mechanical equipment operation and repair.

- **Spatial Relations Aptitude.** Has the ability to mentally visualize the relative positions of objects in three-dimensional space, and how they will be positioned if they are moved in different ways.

- **Working Memory.** Has the ability to maintain information in memory for short periods of time and to retrieve it accurately.

- **General Cognitive Aptitude.** Has the overall capacity to understand and interpret information that is being presented, the ability to identify and solve problems, and the capability to learn new things quickly and efficiently.

- **Perceptual Speed and Accuracy.** Has the ability to recognize and interpret visual information quickly and accurately.

- **Psychomotor Aptitude.** Has the ability to coordinate the simultaneous movements of one's limbs (arms, legs), to operate multiple controls simultaneously, and to make precise control adjustments that involve eye-hand coordination.

- **Conscientiousness/Dependability.** Has the tendency to be trustworthy, reliable, planful, and accountable. Respects the value of discipline. Does not shy away from responsibility.

- **Emotional Stability.** Has the tendency to act rationally, to display a generally calm and even mood, and to maintain composure and not be overly distraught by stressful situations.

- **Need to Achieve and General Energy Level.** Has confidence in own abilities, seeks and enjoys positions of leadership and influence, is typically enthusiastic and energetic, sets high standards, and strives for accomplishment and recognition.

(table continues)

Table 16 (continued)

Predictors of First Tour Job Performance

- **Self-Managed Learning Skill***. Has a clear overall goal of maintaining continuous learning and training over one's entire career. Is proficient at determining personal training needs, planning education and training experiences to meet them, and evaluating one's own level of mastery. Also includes utilizing efficient personal learning strategies (e.g., identifying specific learning goals, organizing the content to be mastered, practicing the new skills in an appropriate context).

- **Self-Management Skill***. Uses appropriate strategies to self-manage the full range of one's work and non-work responsibilities (e.g., assignments, personal finances, family). Such strategies include stating both long and short-term goals, prioritizing goals, allocation of effort and personal resources to goal priorities, self-assessment of degree of goal accomplishment, and seeking help and advice from others when appropriate.

- **Basic Computer Skills***. Uses personal computers and software programs. Creates and maintains computer files. Locates and uses information on the Internet and uses other Internet functions including e-mail.

- **Selfless Service Orientation***. Commits to the greater good of the team or group. Puts organizational goals ahead of individual goals as required.

- **Ethical Value System***. Possesses a moral compass. Follows patterns of behavior consistent with Army Values.

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*These predictors are only relevant for Army XXI.

Table 17
KSA Definitions for NCO Job Performance

Predictors of NCO Job Performance

- **MOS/Occupation-Specific Knowledge and Skill**. Possesses the necessary technical knowledge and skill to perform MOS/occupation-specific technical tasks. Stays informed of the latest developments in field.

- **Common Task Knowledge and Skill**. Possesses the necessary knowledge and skill to perform common tasks at the appropriate skill level (e.g., land navigation, field survival techniques, and NBC protection).

- **Safety Consciousness**. Follows safety guidelines and instructions. Monitors others to ensure compliance.

- **Characteristic Level of Effort and Initiative**. Demonstrates high effort in completing work. Takes independent action when necessary. Seeks out and willingly accepts responsibility and challenging assignments. Persists in carrying out difficult assignments and responsibilities.

- **Relating to and Supporting Others**. Treats others in a courteous, diplomatic, and tactful manner. Provides help and assistance to others. Works effectively as a team member.

- **Characteristic Level of Integrity and Discipline**. Maintains high ethical standards. Does not succumb to peer pressure to commit prohibited, harmful, or questionable acts. Demonstrates trustworthiness and exercises effective self-control. Takes responsibility for decisions.

- **Adherence to Regulations, Policies, and Procedures**. Adheres to policies and follows prescribed procedures in carrying out duties and assignments

- **Military Presence**. Presents a positive and professional image of self and the Army even when off duty. Maintains proper military appearance.

- **Physical Fitness**. Meets Army standards for weight, physical fitness, and strength. Maintains health and fitness to meet deployability and field requirements as well as the physical demands of the daily job.

- **Cultural Tolerance**. Demonstrates tolerance and understanding of other cultures and value systems. Knowledgeable about other cultures' beliefs and customs.

- **Advanced Computer Skills.**[a] Understands numerous computer systems and applications such as Unix, NT, and Army specific systems. Can perform routine troubleshooting.

- **Oral Communication Skill**. Speaks in a clear, organized, and logical manner.

- **Writing Skill**. Communicates thoughts, ideas, and information successfully to others through writing. Uses proper sentence structure including grammar, spelling, capitalization, and punctuation.

- **Judgment and Decision Making Skill**. Reacts to new situations by applying learned principles and experiences appropriately and effectively. Makes timely decisions even with incomplete information.

- **Adaptability**. Can modify behavior or plans as necessary to reach goals. Is able to maintain effectiveness in varying environments with various tasks, responsibilities, or people.

(table continues)

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Table 17 (continued)

Predictors of NCO Job Performance

- **Basic Math Facility**. Knows and applies addition, subtraction, multiplication, division, and simple mathematical formulas.

- **Basic Electronics Knowledge**. Knows general information regarding electronics principles and electronics equipment operation and repair.

- **Basic Mechanical Knowledge**. Knows general information regarding mechanical principles, tools, and mechanical equipment operation and repair.

- **Spatial Relations Aptitude**. Has the ability to mentally visualize the relative positions of objects in three-dimensional space, and how they will be positioned if they are moved in different ways.

- **Working Memory**. Has the ability to maintain information in memory for short periods of time and to retrieve it accurately.

- **General Cognitive Aptitude**. Has the overall capacity to understand and interpret information that is being presented, the ability to identify and solve problems, and the capability to learn new things quickly and efficiently.

- **Perceptual Speed and Accuracy**. Has the ability to recognize and interpret visual information quickly and accurately.

- **Psychomotor Aptitude**. Has the ability to coordinate the simultaneous movements of one's limbs (arms, legs), to operate multiple controls simultaneously, and to make precise control adjustments that involve eye-hand coordination.

- **Conscientiousness/Dependability**. Has the tendency to be trustworthy, reliable, planful, and accountable. Respects the chain of command and the value of discipline. Does not shy away from responsibility.

- **Emotional Stability**. Has the tendency to act rationally, to display a generally calm and even mood, and to maintain composure and not be overly distraught by stressful situations.

- **Need to Achieve and General Energy Level**. Has confidence in own abilities, seeks and enjoys positions of leadership and influence, is typically enthusiastic and energetic, sets high standards, and strives for accomplishment and recognition.

- **Motivating and Leading Others**. Recognizes, encourages, and rewards effective performance of subordinates. Corrects unacceptable conduct. Acts as a role model. Leads by example. Fosters loyalty and commitment.

- **Training Others**. Evaluates and identifies individual or unit training needs. Institutes formal or informal programs to address training needs. Develops others by providing appropriate work experiences. Guides and assists subordinates on technical matters.

- **Directing, Monitoring, and Supervising Work**. Assigns tasks to subordinates. Sets goals, targets, and criteria for work and assignments. Ensures that assignments are clearly understood.

(table continues)

Table 17 (continued)

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<div align="center">Predictors of NCO Job Performance</div>

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- **Self-Directed Learning Skill.**[b] Has a clear overall goal of maintaining continuous learning and training over one's entire career. Is proficient at determining personal training needs, planning education and training experiences to meet them, and evaluating one's own level of mastery. Also includes utilizing efficient personal learning strategies (e.g., identifying specific learning goals, organizing the content to be mastered, practicing the new skills in an appropriate context).

- **General Self-Management Skill.**[b] Uses appropriate strategies to self-manage the full range of one's work and non-work responsibilities (e.g., assignments, personal finances, family). Such strategies include stating both long- and short-term goals, prioritizing goals, allocation of effort and personal resources to goal priorities, self-assessment of degree of goal accomplishment, and seeking help and advice from others when appropriate.

- **Selfless Service Orientation.**[b] Commits to the greater good of the team or group. Puts organizational goals ahead of individual goals as required.

- **Ethical Value System.**[b] Possesses a moral compass. Knows the basic values of the Army as an organization. Follows patterns of behavior consistent with Army Values.

- **Concern for Soldier Quality of Life.**[b] Is aware of subordinates' and peers' needs, constraints, and values. Is sensitive to others' priorities and interests, including on and off duty needs.

- **Fostering Adaptive Teamwork.**[b] Organizes and orients team members to meet goals. Changes organization and focus of group to meet changing missions and conditions.

- **Knowledge of System Inter-Relations.**[b] Is capable of analyzing how goals and operations of own unit are inter-related with other units and systems. Can see the larger strategic picture and interpret how one's own unit relates to it.

- **Knowledge Management.**[b] Applies controls to the flow of digital information. Sorts, classifies, combines, excludes, and presents information so that it is useable by others.

- **Knowledge of Battlefield Function Integration.**[c] Can individually apply and effectively integrate multiple battlefield functions such as direct and indirect fires, communications, intelligence, and combat service support.

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[a] This predictor was "Basic Computer Skills" for Army of Excellence NCOs.

[b] Predictor is relevant for both AXXI and AA2010 Battle Force NCOs, but not Army of Excellence NCOs.

[c] Predictor is only relevant for AA2010 Battle Force NCOs.

One difference between the first tour and NCO KSA sets is that, for NCO promotion decisions, additional KSA information is potentially available. That is, various aspects of the individual's current and past Army performance could be assessed and serve as predictors of future Army performance. In fact, Project A data showed that assessments of first tour performance were valid predictors of junior NCO performance approximately 3-5 years later. Corrected for unreliability, the correlations were in the .40 - .60 range (J. P. Campbell, Peterson, & Johnson, 1994). Further, there was considerable convergent and divergent validity across the major components of soldier performance. That is, a specific component of first tour performance always correlated most highly with its closest counterpart among the NCO performance dimensions.

As can be noted from looking at the KSA array for NCOs, some variables reflect general traits that could only be assessed via standardized "tests" (e.g., General Cognitive Aptitude) and some could only be measured by assessments of current or past performance (e.g., skills as a trainer in the Army context). However, a large proportion of the potential NCO KSAs could be measured either in a standardized testing environment or by systematic assessment of actual job performance (e.g., testing Need to Achieve and General Energy Level using the Army's Assessment of Biographical Life Experiences [ABLE] versus using supervisor ratings to assess Characteristic Level of Effort and Initiative). As indicated by Project A data (J. P. Campbell & Zook, 1991), these two variables have a substantial intercorrelation, but it is by no means perfect, even if the two variables are corrected for attenuation due to unreliability of measurement. Consequently, the pros and cons of using one versus the other in a promotion context must be carefully evaluated.

Army SME Panel KSA Rankings for the Army of Excellence

Tables 18-21 present the KSA rankings for the AOE era which were provided by the Army SME Panel. Although the focus of this research is on the predicted future KSAs, collection of priority rankings of currently required KSAs from SMEs provided interesting comparisons between current and future job requirements.

Note that the ranking exercise at the first tour level was a bit different between the two eras. The SMEs picked the top five AOE KSAs and five second-tier KSAs by consensus, whereas they picked the top eight AXXI KSAs by consensus and each participant nominated an additional seven second-tier KSAs. Time limitations prevented us from requiring the Army SME panelists to reach consensus on the second-tier KSAs for any group other than AOE first tour.

Table 18

Comparison of Top KSAs for First Tour (AOE vs. AXXI)

AOE	AXXI
Top 5 Ranked KSAs	Top 8 Ranked KSAs

AOE — Top 5 Ranked KSAs

1. Conscientiousness/Dependability (1.78)
2. General Cognitive Aptitude(2.00)
3. *Need to Achieve and General Energy Level (2.89)*
4. Reading Skill (4.11)
5. *Psychomotor Aptitude (4.22)*

Second Tier, [a] by consensus:
Oral Communication Skill
Working Memory
Basic Mechanical Knowledge
Perceptual Speed and Accuracy
Emotional Stability

AXXI — Top 8 Ranked KSAs

1. General Cognitive Aptitude (2.13)
2. Conscientiousness/Dependability (2.25)
3. *Selfless Service Orientation (3.63)*
4. *Working Memory (4.25)*
5. Reading Skill (4.50)
6. *Ethical Value System (4.88)*
7. *Ability to Get a Security Clearance (5.88)* [b]
8. *Basic Computer Skills (6.25)*

Second Tier, [c] not by consensus:
Perceptual Speed and Accuracy
Psychomotor Aptitude
Need to Achieve and General Energy Level
Emotional Stability
Oral Communication Skill
Self-Management Skill

Tie for seventh choice
Basic Math Skill
Self-Managed Learning Skill

Note. Parenthetical numbers indicate assigned rankings across judges. Italics indicate the KSA does not appear in the other era's top ranked list. [a]Five second-tier KSAs were selected. [b]This KSA was subsequently dropped. [c]Seven second-tier KSAs were selected.

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Table 19

Comparison of Top KSAs for Junior NCOs (AOE vs. AXXI)

AOE	AXXI
Top 10 Ranked KSAs	Top 10 Ranked KSAs

AOE	AXXI
1. MOS/Occupation-Specific Knowledge and Skill (2.75)	1.5. MOS/Occupational-Specific Knowledge and Skill (3.50)
2. Common Task Knowledge and Skill (3.75)	1.5. Conscientiousness/Dependability (3.50)
3. Conscientiousness/Dependability (4.50)	3. Motivating and Leading Others (4.38)
4. Characteristic Level of Integrity and Discipline (4.63)	4.5. Common Task Knowledge and Skill (4.63)
5. Motivating and Leading Others (4.88)	4.5. Characteristic Level of Integrity and Discipline *(4.63)*
6. Characteristic Level of Effort and Initiative (5.25)	6. Characteristic Level of Effort and Initiative (5.75)
7. General Cognitive Aptitude (6.63)	7. General Cognitive Aptitude (5.88)
8. Need to Achieve and General Energy Level (6.88)	8. Need to Achieve and General Energy Level (6.50)
9. Physical Fitness (7.63)	9. Oral Communication Skill (8.00)
10. Oral Communication Skill (8.13)	10. Physical Fitness (8.63)

AOE	AXXI
Second Tier, [a] not by consensus:	**Second Tier,** [a] not by consensus:
Directing, Monitoring, and Supervising Work	Selfless Service Orientation
Training Others	Ethical Value System
Military Presence	Directing, Monitoring, and Supervising Work
Judgment and Decision Making Skill	Judgment and Decision Making Skill
Tie for fifth choice	**Tie for fifth choice**
Relating to and Supporting Others	Adaptability
Adherence to Regulations, Policies, and Procedures	Working Memory
Emotional Stability	Training Others

Note. Parenthetical numbers indicate assigned rankings across judges. [a] Five second-tier KSAs were selected.

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Table 20

Comparison of Top KSAs for Mid-Level NCOs (AOE vs. AXXI)

AOE	AXXI
Top 10 Ranked KSAs	Top 10 Ranked KSAs

AOE — Top 10 Ranked KSAs

1. Motivating and Leading Others (3.50)
2. MOS/Occupation-Specific Knowledge and Skill (3.88)
3. *Conscientiousness/Dependability (4.63)*
4. Characteristic Level of Integrity and Discipline (4.88)
5. Common Task Knowledge and Skill (5.13)
6. *Characteristic Level of Effort and Initiative (5.50)*
7. Training Others (6.00)
8. Oral Communication Skill (6.38)
9. General Cognitive Aptitude (7.50)
10. Physical Fitness (7.63)

Second Tier,[a] **not by consensus:**
Judgment and Decision Making Skill
Directing, Monitoring, and Supervising Work
Need to Achieve and General Energy Level

Tie for fourth and fifth choices
Adaptability
Emotional Stability
Military Presence

AXXI — Top 10 Ranked KSAs

1. Motivating and Leading Others (3.14)
2. MOS/Occupation-Specific Knowledge and Skill (3.29)
3. *Judgment and Decision Making (4.43)*
4. Common Task Knowledge and Skill (4.71)
5. *Directing, Monitoring, and Supervising Work (5.14)*
6. Characteristic Level of Integrity and Discipline (5.57)
7. Training Others (6.57)
8. General Cognitive Aptitude (6.71)
9. Oral Communication Skill (7.29)
10. Physical Fitness (8.14)

Second Tier,[a] **not by consensus:**
Advanced Computer Skills
Conscientiousness/Dependability
Self-Directed Learning Skill
Ethical Value System

Tie for fifth choice
General Self-Management Skill
Selfless Service Orientation

Note. Parenthetical numbers indicate assigned rankings across judges. Italics indicate the KSA does not appear in the other era's top ranked list. Italics means that the KSA does not appear in the other era's top ranked list. [a] Five second-tier KSAs were selected.

Table 21

Comparison of Top KSAs for Senior NCOs (AOE vs. AXXI)

AOE	AXXI
Top 10 Ranked KSAs	Top 10 Ranked KSAs

AOE	AXXI
1. Characteristic Level of Integrity and Discipline (2.88)	1. Motivating and Leading Others (3.00)
2. Judgment and Decision Making Skill (3.00)	2. Characteristic Level of Integrity and Discipline (4.86)
3. Motivating and Leading Others (3.25)	3.5. *General Cognitive Aptitude (5.14)*
4. *Conscientiousness/Dependability (5.00)*	3.5. Training Others (5.14)
5. Oral Communication Skill (5.75)	5. *Concern for Soldier Quality of Life (5.57)*
6. Adaptability (6.00)	6.5. Oral Communication Skill (6.29)
7. *Directing, Monitoring, and Supervising Work (6.50)*	6.5. Judgment and Decision Making (6.29)
8. Training Others (6.75)	8. Writing Skills (6.57)
9. *Military Presence (7.63)*	9. *General Self-Management Skill (7.29)*
10. Writing Skill (7.75)	10. *Advanced Computer Skills (7.57)*
Second Tier, [a] not by consensus:	**Second Tier,** [a] not by consensus:
Relating to and Supporting Others	Characteristic Level of Effort and Initiative
Emotional Stability	Ethical Value System
Basic Computer Skills	Military Presence
Characteristic Level of Effort and Initiative	Knowledge Management
Tie for fifth choice	**Tie for fifth choice**
Common Task Knowledge and Skill	Physical Fitness
General Cognitive Aptitude	Adaptability
Need to Achieve and General Energy Level	Spatial Relations Aptitude
	Conscientiousness/Dependability
	Emotional Stability
	Need to Achieve and General Energy Level
	Directing, Monitoring, and Supervising Work
	Self-Directed Learning Skill
	Fostering Adaptive Teamwork
	Knowledge of System Inter-Relations

Note. Parenthetical numbers indicate assigned rankings across judges. Italics indicate the KSA does not appear in the other era's top ranked list.
[a] Five second-tier KSAs were selected.

A comparison between the rankings indicates a great deal of consistency in the SME judgments about the critical KSAs now and in AXXI. Three of the top five or eight (depending on the era) first tour KSAs were the same between the two eras (General Cognitive Aptitude, Conscientiousness/Dependability, Reading Skill). The SMEs viewed Emotional Stability and Psychomotor Aptitude as becoming somewhat less important in the AXXI era, and indicated that personal characteristics (i.e., Selfless Service, Ethical Value System, and computer skills would become much more important.

Although the rank ordering differed somewhat, the SMEs chose the same set of top 10 KSAs for junior NCOs in both eras (AOE and AXXI). This is remarkable, especially given that the AXXI list of potential KSAs included several more items than the AOE list. There was slightly less agreement for mid-level NCOs, with 8 of the 10 top KSAs being the same for both eras. At the senior NCO level, 6 of the top 10 KSAs were the same for both eras. Adaptability, Conscientiousness/Dependability, and Direct, Monitor, and Supervise Work fell the furthest out of the first tier, being replaced by General Cognitive Aptitude, Concern for Soldier Quality of Life, Self-Management Skill, and Advanced Computer Skills in the AXXI era.

Comparison of Panel KSA Rankings for each Future Target Group

As described previously, both the Army SME Panel and the Psychologist Panel reached a consensus on the 8 most important KSAs for AXXI first tour performance and the 10 most important KSAs for junior, mid-level, and senior AXXI NCOs and for the AA2010 Battle Force NCOs. Within each top 8 or top 10, the KSAs were rank ordered in importance by averaging rankings across judges within each panel.

The individuals in both panels also nominated a second set of KSAs as the next most important. There were seven KSAs nominated by each judge for this "second tier" for first tour performance and five KSAs nominated for the second tier for each of the four NCO target groups. The Army SME Panel did not reach consensus on nominations for the second tier of KSAs and the KSAs and nominations for the second tier were not rank ordered. The importance ordering for the second tier was obtained simply from the frequency of nominations, which often incorporated a number of ties. The Psychologist Panel determined both the first- and second-tier KSAs through consensus discussions, but only rank ordered the first tier group.

The comparative results for the KSA importance orderings for each of the two panels are shown in Tables 22 through 26, one table for each of the target groups. KSAs ranked in the top eight (first tour) or top 10 (the four NCO groups) by one panel but not by the other are shown in italics. For KSAs ranked in the top tier by both panels, any major differences in rank orderings between the two groups are also indicated. For purposes of these tables, a change in rank of ± 1.0 is considered no change.

Table 22
Panel Comparison of Top KSAs for First Tour (AXXI)

Army SME Panel	Psychologist Panel
Top 8 Ranked KSAs	Top 8 Ranked KSAs

	Army SME Panel			Psychologist Panel
1.	General Cognitive Aptitude (2.13)	(0)[a]	1.	General Cognitive Aptitude (1.14)
2.	Conscientiousness/Dependability (2.25)	(0)	2.	Conscientiousness/Dependability (3.57)
3.	*Selfless Service Orientation (3.63)*	(+)	3.	Reading Skill (4.14)
4.	Working Memory (4.25)		4.	*Oral Communication Skill (4.86)*
5.	Reading Skill (4.50)	(-)	5.5.	Working Memory (5.29)
6.	*Ethical Value System (4.88)*		5.5.	*Need to Achieve and General Energy Level (5.29)*
7.	*Ability to Get a Security Clearance (5.88)[b]*		7.5.	*Emotional Stability (5.86)*
8.	*Basic Computer Skills (6.25)*		7.5.	*Self-Management Skill (5.86)*

Second Tier,[c] not by consensus:
    Perceptual Speed and Accuracy
    Psychomotor Aptitude
    Need to Achieve and General Energy Level
    Emotional Stability
    Oral Communication Skill
    Self-Management Skill
Tie for seventh choice
    Basic Math Skill
    Self-Managed Learning Skill

Second Tier,[c] by consensus:
    Basic Math Skill
    Basic Electronics Knowledge
    Basic Mechanical Knowledge
    Spatial Relations Aptitude
    Psychomotor Aptitude
    Self-Managed Learning Skill

Note. Parenthetical numbers indicate assigned rankings across judges. Italics indicate the KSA does not appear in the other era's top ranked list. [a](0) = stayed in same rank; (+) = moved up in rank at least one and a half places; (-) = moved down in rank at least one and a half places. [b]This KSA was subsequently dropped. [c]Seven second-tier KSAs were selected..

Table 23
Panel Comparison of Top KSAs for Junior NCOs (AXXI)

Army SME Panel		Psychologist Panel
Top 10 Ranked KSAs		Top 10 Ranked KSAs

Army SME Panel		Psychologist Panel
1.5. MOS/Occupation-Specific Knowledge and Skill (3.50)	$(+)^a$	1. General Cognitive Aptitude (3.38)
1.5. Conscientiousness/Dependability (3.50		2. MOS/Occupation Specific Knowledge and Skill (4.38)
3. Motivating and Leading Others (4.38)		3.5. *Judgment and Decision Making Skill (4.63)*
4.5. *Common Task Knowledge and Skill (4.63)*	$(-)$	3.5. Conscientiousness/Dependability (4.63)
4.5. Characteristic Level of Integrity and Discipline (4.63)	(0)	5. Characteristic Level of Effort and Initiative (5.50)
6. Characteristic Level of Effort and Initiative (5.75)	$(+)$	6.5. Need to Achieve and General Energy Level (5.75)
7. General Cognitive Aptitude (5.88)	$(-)$	6.5. Motivating and Leading Others (5.75)
8. Need to Achieve and General Energy Level (6.50)		8. *Relating to and Supporting Others (6.63)*
9. Oral Communication Skill (8.00)		9. *Fostering Adaptive Teamwork (6.75)*
10. Physical Fitness (8.63)	(0)	10. Oral Communication Skill (7.13)

Second Tier,[b] not by consensus:
Selfless Service
Ethical Value System
Directing, Monitoring, and Supervising Work
Judgment and Decision Making Skill
Tie for fifth choice
Adaptability
Working Memory
Training Others

Second Tier,[b] by consensus:
Characteristic Level of Integrity and Discipline
Adaptability
Emotional Stability
Training Others (tie)
General Self-Management (tie)
Directing, Monitoring, and Supervising Work

Note. Parenthetical numbers indicate assigned rankings across judges. Italics indicate the KSA does not appear in the other era's top ranked list.
[a] (0) = stayed in same rank; (+) = moved up in rank at least one and a half places; (-) = moved down in rank at least one and a half places. [b]Five second tier KSAs were selected.

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Table 24

Panel Comparison of Top KSAs for Mid-Level NCOs (AXXI)

	Army SME Panel		Psychologist Panel
	Top 10 Ranked KSAs		Top 10 Ranked KSAs

	Army SME Panel			Psychologist Panel
1.	Motivating and Leading Others (3.14)	$(+)^a$	1.	General Cognitive Aptitude (3.00)
2.	*MOS/Occupation-Specific Knowledge and Skill (3.29)*	(0)	2.	Judgment and Decision Making Skill (4.25)
3.	Judgment and Decision Making (4.43)		3.	*Characteristic Level of Effort and Initiative (5.13)*
4.	*Common Task Knowledge and Skill (4.71)*		4.	Directing, Monitoring, and Supervising Work (5.38)
5.	Directing, Monitor, and Supervising Work (5.14)		5.	*Adaptability (5.50)*
6.	*Characteristic Level of Integrity and Discipline (5.57)*		6.	*Need to Achieve and General Energy Level (5.63)*
7.	Training Others (6.57)	$(+)$	7.	Oral Communication Skill (5.75)
8.	General Cognitive Aptitude (6.71)		8.	*Conscientiousness/Dependability (6.00)*
9.	Oral Communication Skill (7.29)	$(-)$	9.	Motivating and Leading Others (6.25)
10.	*Physical Fitness (8.14)*	$(-)$	10.	Training Others (8.13)

Second Tier, [b] not by consensus:
  Advanced Computer Skills
  Conscientiousness/Dependability
  Self-Directed Learning Skill
  Ethical Value System
  Tie for fifth choice
  General Self-Management Skill
  Selfless Service Orientation

Second Tier, [b] by consensus:
  MOS/Occupation-Specific Knowledge and Skill
  Relating to and Supporting Others
  Characteristic Level of Integrity and Discipline
  Emotional Stability
  Concern for Soldier Quality of Life

Note. Parenthetical numbers indicate assigned rankings across judges. Italics indicate the KSA does not appear in the other era's top ranked list. [a] (0) = stayed in same rank; (+) = moved up in rank at least one and a half places; (-) = moved down in rank at least one and a half places. [b] Five second tier KSAs were selected.

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Table 25

Panel Comparison of Top KSAs for Senior NCOs (AXXI)

Army SME Panel		Psychologist Panel
Top 10 Ranked KSAs		Top 10 Ranked KSAs
1. Motivating and Leading Others (3.00)	(+)[a]	1. General Cognitive Aptitude (2.25)
2. Characteristic Level of Integrity and Discipline (4.86)	(+)	2. Judgment and Decision Making Skill (4.38)
3.5. General Cognitive Aptitude (5.14)		3. *Need to Achieve and General Energy Level (4.63)*
3.5. Training Others (5.14)	(-)	4. Motivating and Leading Others (5.38)
5. Concern for Soldier Quality of Life (5.57)		5. *Knowledge of System Inter-Relations (5.50)*
6.5. Oral Communication Skill (6.29)		6. *Characteristic Level of Effort and Initiative (5.75)*
6.5. Judgment and Decision Making Skill (6.29)	(+)	7. *Adaptability (5.83)*
8. *Writing Skill (6.57)*		8. *Directing, Monitoring, and Supervising Work (6.00)*
9. General Self-Management Skill (7.29)	(-)	9.5. Concern for Soldier Quality of Life (7.63)
10. *Advanced Computer Skills (7.57)*	(-)	9.5. Oral Communication Skill (7.63)

Second Tier,[b] not by consensus:
Characteristic Level of Effort and Initiative
Ethical Value System
Military Presence
Knowledge Management
Tie for fifth choice
Physical Fitness
Adaptability
Spatial Relations Aptitude
Conscientiousness/Dependability
Emotional Stability
Need to Achieve and General Energy Level
Directing, Monitoring, and Supervising Work
Self-Directed Learning Skill
Fostering Adaptive Teamwork
Knowledge of System Inter-Relations

Second Tier,[b] by consensus:
Relating to and Supporting Others
Characteristic Level of Integrity and Discipline
Writing Skill
Emotional Stability
Ethical Value System

Note. Parenthetical numbers indicate assigned rankings across judges. Italics indicate the KSA does not appear in the other era's top ranked list. [a] (0) = stayed in same rank; (+) = moved up in rank at least one and a half places; (-) = moved down in rank at least one and a half places. [b]Five second tier KSAs were selected.

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Table 26
Panel Comparison of Top KSAs for Battle Force NCOs (Army After 2010)

Army SME Panel	Psychologist Panel
Top 10 Ranked KSAs	Top 10 Ranked KSAs

Army SME Panel — Top 10 Ranked KSAs

1. Judgment and Decision Making Skill (1.71)
2. *Motivating and Leading Others (4.14)*
3. General Cognitive Aptitude (4.43)
4. *Perceptual Speed and Accuracy (4.71)*
5. Knowledge Management (5.00)
6. Advanced Computer Skills (5.71)
7. Spatial Relations Aptitude (6.14)
8. *Training Others (7.14)*
9. Knowledge of Battlefield Function Integration (7.86)
10. *General Self-Management Skill (8.14)*

Second Tier,[b] not by consensus:
  Characteristic Level of Integrity and Discipline
  Emotional Stability
  Self-Directed Learning Skill
  Selfless Service Orientation

Tie for fifth choice
  MOS/Occupation-Specific Knowledge and Skill
  Characteristic Level of Effort and Initiative
  Physical Fitness
  Adaptability
  Basic Electronics Knowledge
  Psychomotor Aptitude
  Ethical Value System
  Concern for Soldier Quality of Life
  Knowledge of System Inter-Relations

Psychologist Panel — Top 10 Ranked KSAs

(+)[a] 1. General Cognitive Aptitude (1.88)
(0) 2. Judgment and Decision Making Skill (4.13)
3. *Adaptability (5.25)*
4. *Knowledge of System Inter-Relations (5.50)*
5. *Emotional Stability (5.63)*
(+) 6. Knowledge of Battlefield Function Integration (5.75)
7. *Physical Fitness (6.38)*
8. *Conscientiousness/Dependability (6.75)*
9.5. *Need to Achieve and General Energy Level (6.88)*
9.5. *Self-Directed Learning Skill (6.88)*

Second Tier,[b] by consensus:
  Characteristic Level of Effort and Initiative
  Characteristic Level of Integrity and Discipline
  Oral Communication Skill
  General Self-Management Skill
  Selfless Service Orientation

Note. Parenthetical numbers indicate assigned rankings across judges. Italics indicate the KSA does not appear in the other era's top ranked list. [a] (0) = stayed in same rank; (+) = moved up in rank at least one and a half places; (-) = moved down in rank at least one and a half places. [b] Five second tier KSAs were selected.

The principal findings from each of the five comparisons are summarized below.

Army XXI (First Tour)

Both the SME and Psychologist Panels placed their highest priorities on General Cognitive Aptitude and Conscientiousness/Dependability. This is consistent with the personnel selection research literature which, over hundreds of validation studies, shows these two variables to be the most valid predictors of general job performance (Schmidt & Hunter, 1998). It is also worth noting that, while the Psychologist Panel members were well aware of this research literature, the Army SMEs most likely were not, and yet they have the same top priorities. Reading Skill and Working Memory were also highly ranked by both groups, but it is also true that the current literature shows these two variables to be highly correlated with measures of General Cognitive Aptitude (e.g., Kyllonen & Christal, 1988, 1990).

The Army SMEs emphasized Ethical Values, Selfless Service (i.e., the group over the individual), and a lack of counterproductive behavior in the individual's pre-Army experience (Ability to Get a Security Clearance). They expressed great concern about the future mismatch between the Army's value system and the operative values of the potential applicant population. The psychologists, on the other hand, emphasized two Big Five personality factors (Need for Achievement/Energy Level and Emotional Stability), Self-Management Skill, and Oral Communication Skill.

Finally, there was a slight tendency for the psychologists to rank the technical knowledge and skill KSAs ahead of the perceptual speed and accuracy/psychomotor aptitudes and vice versa for the Army SMEs. In general, the psychologists seemed to be more influenced by the forecasts of technological change and requirements for independent action while the Army SMEs were worried more about the values and basic abilities of the applicant population.

Army XXI (Junior NCO)

Recall that the number of NCO predictors rated by the panels was considerably larger than the first tour list, in large part because they include many predictors that could be assessed on the basis of performance as a first tour soldier. Even with these differences, as with first tour soldiers, both panels ranked Conscientiousness/Dependability and General Cognitive Aptitude highly. The psychologists, however, gave these predictors higher priority than did the SMEs. MOS Specific Knowledge and Skill was also highly ranked by both panels, as was one facet of leadership skill—Motivating and Leading Others. Finally, Characteristic Level of Effort/Initiative and Need to Achieve/Energy Level were ranked in the top 10 by both groups. In general, there was considerable agreement between the two panels' top 10 lists.

With regard to differences between the two sets of judges, the Army SMEs gave more emphasis to two predictors—Common Task Knowledge/Skill and Integrity/Discipline. They also had Physical Fitness in their top 10 list, whereas this was not mentioned at all by the psychologists. Psychologists gave more emphasis to Judgment and Decision Making Skill as well as to team skills (i.e., Relating to and Supporting Others; Fostering Adaptive Team Work). In summary, there seemed to be an overall tendency for the psychologists to see the AXXI junior NCO as more of a supervisor and team leader than did the Army SMEs.

Army XXI (Mid-Level NCO)

For both panels, there was a major increase at the mid-level NCO in the number of top 10 KSAs that reflect assessment of prior leadership performance (i.e., Motivating and Leading Others; Training Others; Directing, Monitoring, and Supervising Work). Judgment and Decision Making Skill also took on a very high priority for both groups, as did Oral Communication Skill.

For Army SMEs, MOS Specific and Common Task Knowledge/Skill remained very critical for the AXXI mid-level NCO as they were for the junior NCO, but not so for the psychologists. The Army SMEs also viewed General Cognitive Aptitude as still being important at this level, but considered it significantly less critical than the psychologists who retained it as the most important predictor. Moreover, Physical Fitness was still in the Army SME top 10. KSAs pertaining to effort, initiative, achievement, and conscientiousness were given a higher priority by psychologists than KSAs pertaining to integrity, discipline, and values. Adaptability moved into the top 10 for the Psychologist Panel.

Army XXI (Senior NCO)

Moving to the AXXI senior NCO target group, the two panels maintained a strong emphasis on leadership KSAs (Motivating and Leading Others, Concern for Soldier Quality of Life), and both General Cognitive Aptitude and Judgment/Decision Making Skill were highly ranked.

Relative to the mid-level NCO, the Army SMEs viewed Writing Skill, Self-Management, and Advanced Computer Skills as more critical, but they still emphasized Level of Integrity and Discipline. In contrast, the psychologists, still ranked Adaptability as highly critical; Need to Achieve/Energy Level and Level of Effort/Initiative also remained high priorities for this panel.

In general, the Army SMEs seemed to see the AXXI senior NCO as more of a leader/supervisor (Training Others) while the psychologists seemed to view this job as needing advanced management knowledges and skills (Knowledge of System Interrelations; Directing, Monitoring, and Supervising Work).

Army After 2010 Battle Force NCO

Recall that only one level of job was considered in the AA2010 era – the Battle Force NCO. Both panels ranked General Cognitive Aptitude as well as Judgment and Decision Making Skill very high for this group. Self-Management Skill was also seen as a very important KSA by both panels.

For the Army SMEs, perceptual and spatial aptitudes became very critical, as well as computer and information management skills. They also emphasized the motivating and training aspects of leadership.

Besides General Cognitive Aptitude and Judgment/Decision Making, the major emphases for the psychologists were on temperament/personality, physical fitness, and self-management factors. The KSAs pertaining to information management and leadership were absent. However, high Psychologist Panel rankings for Knowledge of System Inter-relations and Knowledge of

Battlefield Function Integration suggest that a real time awareness and understanding of multiple battlefield functions was viewed as an important performance determinant.

In general, there is more disagreement here between the two panels than for any other of the target groups. The Army SMEs tended to emphasize specific ability and technical skills while the psychologists emphasized adaptability, emotional stability, energy level, dependability and physical fitness. These are somewhat different views of the critical KSAs for the Battle Force NCO. The Army SMEs seemed to be responding to changing technological requirements while the psychologist judges seemed to emphasize the demands imposed by higher levels of mental and physical stress. Given the breadth of change forecasted for the AA2010 period, these perspectives were not necessarily in conflict.

Summary Comparison of Army SME and Psychologist KSA Rankings

Now that we have compared the Army SME and psychologist predictions about the critical KSAs for each of the individual target groups, what can we conclude about their judgments overall? For one thing, the Army SMEs worried a lot about whether the attitudes and values of new recruits will match the Army's values (e.g., place the group ahead of the individual). The psychologists did not focus on these kinds of KSAs.

A consistent finding across all target groups is that both panels placed a very high emphasis on General Cognitive Aptitude and Conscientiousness/Dependability. For the Army SMEs, the priority for General Cognitive Aptitude decreases as the target group becomes more senior, but it is reasserted for the Battle Force NCO. General Cognitive Aptitude was consistently given high priority by the psychologists.

In general, the Army SMEs placed a higher priority on integrity and discipline (and a lack of counterproductive behavior) while psychologists just as consistently emphasized high energy, initiative, and achievement striving. With regard to the measurement of such variables, the SMEs tended to emphasize KSAs that could be based on assessments of previous job performance. The psychologists tended to emphasize stable traits that could be measured via standardized tests.

For NCOs, the Army SMEs also consistently gave high priorities to both MOS-specific task and common task proficiency. They also tended to emphasize more of the consideration or person centered components of prior leadership/supervisory performance while the psychologists placed somewhat more emphasis on the initiating structure and directing components of the leadership role. Unlike the psychologists, the Army SMEs also gave relatively high priority to physical fitness and computer skills. The psychologists gave high priority to adaptability, but this was seldom mentioned by the Army SMEs.

The least agreement between the two panels related to the identification of critical KSAs for AA2010 Battle Force NCO performance. The psychologists emphasized adaptability, emotional stability, energy level, and broader battlefield function knowledge. The SMEs placed more emphasis on technical and cognitive skills, as well as specific components of leadership.

For AXXI and Battle Force NCOs, both panels placed a high priority on Judgment and Decision Making and seemed to view it as distinct from General Cognitive Aptitude and technical skill. This variable deserves close attention.

Project Staff Panel

The independent judgments of the Army SME and the Psychologist Panels needed to be combined to make it easier to make decisions based on their judgments. The synthesis of the two sets of importance orderings was accomplished by a working group of contractor and ARI staff. As indicated in the Methodology section, this group developed a relatively simple set of decision rules that were used to identify and rank order the very highest priority subset. After that, KSAs were prioritized in "blocks." KSAs were not ordered by importance within blocks.

Future KSA Priorities for First Tour Selection (Army XXI)

As indicated in Table 27, the strong consensus was that the first tour soldier in the future Army will be best selected on the basis of the general factor (General Cognitive Aptitude, Reading Skill, Working Memory), basic temperament attributes (conscientiousness, emotional stability, achievement orientation and energy), the match with the Army's ethics and values, self-management skills, and basic computer skills. The lowest priorities were given to basic technical knowledges and skills, perhaps because the ASVAB already measures these variables.

In general, the first tour KSA importance rankings seem quite responsive to the projected future changes in the Army's environment and performance requirements. For the soldiers of the future, a number of basic temperament characteristics, appropriate values, and self-management skills take on considerable importance. Measures of these variables are also receiving increasing attention in the private sector. However, vexing problems of potential response distortion in self-reporting remain and will require additional research attention.

Future KSA Priorities for NCO Promotion Systems (Army XXI)

As shown in Tables 28-31, and comparatively in Table 32, there were distinctive features of the NCO KSA priority rankings as a function of target groups and also as a function of the forecasted changes in AA2010 performance requirements.

For the junior NCO, as for the first tour soldier, Conscientiousness/Dependability, General Cognitive Aptitude, Need for Achievement and Energy Level, and Oral Communication Skill were given very high priorities. MOS-Specific Knowledge and Skill, basic skills in Motivating and Leading Others and first tour performance dimensions that assess Effort/Initiative and Integrity/Discipline were also given very high priorities. To some degree these rankings present a choice between measuring dependability and achievement striving with standardized "trait" measures or assessing the same behaviors as part of current or past performance. The fact that both kinds of potential measures were highly ranked emphasizes the priority given to them for junior NCO promotion. In general, in addition to General Cognitive Aptitude, junior NCOs were seen as needing high dependability and high energy, and should be highly rated on MOS-Specific Knowledge and Skill. They should also have demonstrated foundational leadership skills (Motivating and Leading Others) as a first tour soldier. The overall picture was of a technically skilled individual who is committed to the Army and has the skills necessary for beginning to take on leadership responsibilities.

Table 27

Most Important KSAs for First Tour Job Performance (Army XXI)

Rank

1. General Cognitive Aptitude 2. Conscientiousness/Dependability 3. Reading Skill 4. Working Memory	In top tier of Army SME and Psychologist panels.
Emotional Stability Need to Achieve and General Energy Level Oral Communication Skill	In top tier of one panel and in 2nd tier of the other panel.
Self-Management Skill	In top tier of one panel and tied for inclusion in 2nd tier for the other panel.
Basic Computer Skills Ethical Value System Selfless Service Orientation	In top tier of one panel and in 3rd tier for the other panel.
Perceptual Speed and Accuracy Psychomotor Aptitude	In 2nd tier for both panels.
Basic Math Skill Self-Managed Learning Skill	In 2nd tier of one panel and tied with other KSAs for inclusion in 2nd tier.
Basic Electronics Knowledge Basic Mechanical Knowledge Spatial Relations Aptitude	In 2nd tier of one panel and in 3rd tier of the other panel.
Writing Skill	In 3rd tier of both panels.

Table 28
Most Important KSAs for Promotion to Junior NCO (Army XXI)

Rank
1. Conscientiousness/Dependability
2. MOS/Occupation-Specific Knowledge and Skill
3. General Cognitive Aptitude
4. Motivating and Leading Others
5. Characteristic Level of Effort and Initiative
6. Need to Achieve and General Energy Level
7. Oral Communication Skill

> In top tier of Army SME and Psychologist Panels.

Characteristic Level of Integrity and Discipline
Judgment and Decision Making Skill

> In top tier of one panel and in 2nd tier of the other panel.

Common Task Knowledge and Skill
Fostering Adaptive Teamwork
Physical Fitness
Relating to and Supporting Others

> In top tier of one panel and in 3rd tier for the other panel.

Directing, Monitoring, and Supervising Work

> In 2nd tier for both panels.

Adaptability
Training Others

> In 2nd tier of one panel and tied with other KSAs for inclusion in 2nd tier.

Ethical Value System
General Self-Management Skill
Selfless Service Orientation
Working Memory

> In 2nd tier of one panel (or tied for 2nd) and in 3rd tier of other panel.

Adherence to Regulations, Policies, and Procedures
Advanced Computer Skills
Basic Electronics Knowledge
Basic Math Facility
Basic Mechanical Knowledge
Concern for Soldier Quality of Life
Cultural Tolerance
Emotional Stability
Knowledge Management
Knowledge of System Inter-relations
Military Presence
Perceptual Speed and Accuracy
Psychomotor Aptitude
Safety Consciousness
Self-Directed Learning Skill
Spatial Relations Aptitude
Writing Skill

> In 3rd tier of both panels.

Table 29
Most Important KSAs for Promotion to Mid-Level NCO (Army XXI)

Rank
1. Judgment and Decision Making Skill
2. General Cognitive Aptitude
3. Directing, Monitoring and Supervising Others
4. Motivating and Leading Others
5. Oral Communication Skill
6. Training Others

> In top tier of Army SME and Psychologis panels.

Characteristic Level of Integrity and Discipline
Conscientiousness/Dependability
MOS/Occupation-Specific Knowledge and Skill

> In top tier of one panel and in 2nd tier of the other panel.

Adaptability
Characteristic Level of Effort and Initiative
Common Task Knowledge and Skill
Need to Achieve and General Energy Level
Physical Fitness

> In top tier of one panel and in 3rd tier for the other panel.

Advanced Computer Skills
Concern for Soldier Quality of Life
Emotional Stability
Ethical Value System
General Self-Management Skill
Relating to and Supporting Others
Self-Directed Learning Skill
Selfless Service Orientation

> In 2nd tier of one panel (or tied for 2nd) and in 3rd tier of the other panel.

Adherence to Regulations, Policies, and Procedures
Basic Electronics Knowledge
Basic Math Facility
Basic Mechanical Knowledge
Cultural Tolerance
Fostering Adaptive Teamwork
Knowledge Management
Knowledge of System Inter-relations
Military Presence
Perceptual Speed and Accuracy
Psychomotor Aptitude
Safety Consciousness
Spatial Relations Aptitude
Working Memory
Writing Skill

> In 3rd tier of both panels.

Table 30
Most Important KSAs for Promotion to Senior NCO (Army XXI)

Rank
1. General Cognitive Aptitude
2. Motivating and Leading Others
3. Judgment and Decision Making
4. Concern for Soldier Quality of Life
5. Oral Communication Skill

> In top tier of Army SME and Psychologist panels.

Characteristic Level of Effort and Initiative
Characteristic Level of Integrity and Discipline
Writing Skill

> In top tier of one panel and in 2nd tier of the other panel.

Adaptability
Directing, Monitoring, and Supervising Work
Knowledge of System Inter-relations
Need to Achieve and General Energy Level

> In top tier of one panel and tied for inclusion in 2nd tier for the other panel.

Advanced Computer Skills
General Self-Management Skill
Training Others

> In top tier of one panel and in 3rd tier for the other panel.

Ethical Value System

> In 2nd tier for both panels.

Emotional Stability

> In 2nd tier of one panel and tied with other KSAs for inclusion in 2nd tier.

Conscientiousness/Dependability
Fostering Adaptive Teamwork
Knowledge Management
Military Presence
Physical Fitness
Relating to and Supporting Others
Self-Directed Learning Skill
Spatial Relations Aptitude

> In 2nd tier of one panel (or tied for 2nd) and in 3rd tier of the other panel.

Adherence to Regulations, Policies, and Procedures
Basic Electronics Knowledge
Basic Math Facility
Basic Mechanical Knowledge
Common Task Knowledge and Skill
Cultural Tolerance
MOS/Occupation-Specific Knowledge and Skill
Perceptual Speed and Accuracy
Psychomotor Aptitude
Safety Consciousness
Selfless Service Orientation
Working Memory

> In 3rd tier of both panels.

Table 31
Most Important KSAs for Battle Force NCO (Army After 2010)

<u>Rank</u>

1. Judgment and Decision Making 2. General Cognitive Aptitude 3. Knowledge of Battlefield Function Integration	In top tier of Army SME and Psychologist panels.
Emotional Stability General Self-Management Skill Self-Directed Learning Skill	In top tier of one panel and in 2nd tier of the other panel.
Adaptability Knowledge of System Inter-relations Physical Fitness	In top tier of one panel and tied for inclusion in 2nd tier for the other panel.
Advanced Computer Skills Conscientiousness/Dependability Knowledge Management Motivating and Leading Others Need to Achieve and General Energy Level Perceptual Speed and Accuracy Spatial Relations Aptitude Training Others	In top tier of one panel and in 3rd tier for the other panel.
Characteristic Level of Integrity and Discipline Selfless Service Orientation	In 2nd tier for both panels.
Characteristic Level of Effort and Initiative	In 2nd tier of one panel and tied with other KSAs for inclusion in 2nd tier.
Basic Electronics Knowledge Concern for Soldier Quality of Life Ethical Value System MOS/Occupation-Specific Knowledge and Skill Oral Communication Skill Psychomotor Aptitude	In 2nd tier of one panel (or tied for 2nd) and in 3rd tier of the other panel.
Adherence to Regulations, Policies, and Procedures Basic Math Facility Basic Mechanical Knowledge Common Task Knowledge and Skill Cultural Tolerance Directing, Monitoring, and Supervising Work Fostering Adaptive Teamwork Military Presence Relating to and Supporting Others Safety Consciousness Working Memory Writing Skill	In 3rd tier of both panels.

Table 32

Comparison of KSA Importance Across NCO Target Groups for Army XXI and Army After 2010

	Junior NCO	Mid-level NCO	Senior NCO	Battle Force NCO
Top Tier KSAs – Combined mean rank from Army SME and Psychologist Panels	1. Conscientiousness/Dependability 2. MOS/Occupation-Specific Knowledge and Skill 3. General Cognitive Aptitude 4. Motivating and Leading Others 5. Characteristic Level of Effort and Initiative 6. Need to Achieve and General Energy Level 7. Oral Communication Skill	(↑) 1. Judgment and Decision Making Skill 2. General Cognitive Aptitude (↑) 3. Directing, Monitoring and Supervising Work 4. Motivating and Leading Others 5. Oral Communication Skill (↑) 6. Training Others	1. General Cognitive Aptitude 2. Motivating and Leading Others 3. Judgment and Decision Making Skill (↑) 4. Concern for Soldier Quality of Life 5. Oral Communication Skill	1. Judgment and Decision Making 2. General Cognitive Aptitude 3. Knowledge of Battlefield Function Integration
In top tier of one panel and in 2nd tier of the other panel	Characteristic Level of Integrity and Discipline Judgment and Decision Making Skill	Characteristic Level of Integrity and Discipline (↓) Conscientiousness/Dependability (↓) MOS/Occupation-Specific Knowledge and Skill	(↑) Characteristic Level of Effort and Initiative Characteristic Level of Integrity and Discipline (↑) Writing Skill	Emotional Stability General Self-Management Skill Self-Directed Learning Skill
In top tier of one panel and tied for inclusion in 2nd tier for the other panel	None	None	(↑) Adaptability (↓) Directing, Monitoring, and Supervising Work (↑) Knowledge of System Inter-Relations (↑) Need to Achieve and General Energy Level	Adaptability Knowledge of System Inter-relations Physical Fitness
In top tier of one panel and in 3rd tier for the other panel	Common Task Knowledge and Skill Fostering Adaptive Teamwork Physical Fitness Relating to and Supporting Others	(↑) Adaptability (↓) Characteristic Level of Effort and Initiative Common Task Knowledge and Skill (↓) Need to Achieve and General Energy Level Physical Fitness	(↑) Advanced Computer Skills (↑) General Self-Management Skill (↓) Training Others	Advanced Computer Skills Conscientiousness/Dependability Knowledge Management Motivating and Leading Others Need to Achieve and General Energy Level Perceptual Speed and Accuracy Spatial Relations Aptitude Training Others

(table continues)

Note. The ↑ symbol signifies that a KSA has moved up at least one "level" (or row) in importance and the ↓ symbol means that a KSA has moved down in importance. The comparisons are mid-level to junior, senior to mid-level, AAXI only. The comparisons are limited to the first 4 levels (rows).

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Table 32 (continued)

	Junior NCO	Mid-level NCO	Senior NCO	Battle Force NCO
In 2nd tier for both panels	Directing, Monitoring, and Supervising Work	None	Ethical Value System	Characteristic Level of Integrity and Discipline Selfless Service Orientation
In 2nd tier of one panel & tied w/ other KSAs for 2nd tier	Adaptability Training Others	None	Emotional Stability	Characteristic Level of Effort and Initiative
In 2nd tier of one panel (or tied for 2nd) and 3rd tier of the other panel	Ethical Value System General Self-Management Skill Selfless Service Orientation Working Memory	Advanced Computer Skills Concern for Soldier Quality of Life Emotional Stability Ethical Value System General Self-Management Skill Relating to and Supporting Others Self-Directed Learning Skill Selfless Service Orientation	Conscientiousness/Dependability Fostering Adaptive Teamwork Knowledge Management Military Presence Physical Fitness Relating to and Supporting Others Self-Directed Learning Skill Spatial Relations Aptitude	Basic Electronics Knowledge Concern for Soldier Quality of Life Ethical Value System MOS/Occupation-Specific Knowledge and Skill Oral Communication Skill Psychomotor Aptitude
In 3rd tier of both panels	Adherence to Regulations, Policies, and Procedures Advanced Computer Skills Basic Electronics Knowledge Basic Math Facility Basic Mechanical Knowledge Concern for Soldier Quality of Life Cultural Tolerance Emotional Stability Knowledge Management Knowledge of System Inter-Relations Military Presence Perceptual Speed and Accuracy Psychomotor Aptitude Safety Consciousness Self-Directed Learning Skill Spatial Relations Aptitude Writing Skill	Adherence to Regulations, Policies, and Procedures Basic Electronics Knowledge Basic Math Facility Basic Mechanical Knowledge Cultural Tolerance Fostering Adaptive Teamwork Knowledge Management Knowledge of System Inter-Relations Military Presence Perceptual Speed and Accuracy Psychomotor Aptitude Safety Consciousness Spatial Relations Aptitude Working Memory Writing Skill	Common Task Knowledge and Skill MOS/Occupation-Specific Knowledge and Skill Safety Consciousness Adherence to Regulations, Policies, and Procedures Cultural Tolerance Basic Electronics Knowledge Basic Math Facility Basic Mechanical Knowledge Working Memory Perceptual Speed and Accuracy Psychomotor Aptitude Selfless Service Orientation	Adherence to Regulations, Policies, and Procedures Basic Math Facility Basic Mechanical Knowledge Common Task Knowledge and Skill Cultural Tolerance Directing, Monitoring, and Supervising Work Fostering Adaptive Teamwork Military Presence Relating to and Supporting Others Safety Consciousness Working Memory Writing Skill

For the mid-level NCO, the picture changed somewhat. Leadership skills took on a much higher priority and included more facets of the leader/supervisor role (i.e., Directing, Monitoring, Supervising; Training Others). Judgment and Decision Making Skill, or being able to appropriately apply what you know to problems encountered on the job or in the field, became of paramount importance, which was also consistent with the demands of the leadership role. As portrayed in these priorities, the mid-level NCO positions will be the most face-to-face leadership intensive positions in the Army and the future promotion system should be responsive to these priorities.

As promotion progresses to higher NCO skill levels for AXXI, the dispositional and performance factors pertaining to dependability, integrity, effort level, and initiative tended to receive somewhat lower priorities. Most likely this was because the panelists believed that as the pool of candidates for promotion becomes more and more selective as regards these variables, there are no "low scorers" left.

The priorities for senior NCOs reflected a greater concern for broader management and staff responsibilities with somewhat less emphasis on direct training and supervision. In addition to high priorities for General Cognitive Aptitude and Judgment/Decision Making Skill, the more specific information management and systems knowledge KSAs increased in importance. The senior NCO must also be able to communicate effectively, both orally and in writing. However, Oral Communication Skill was given a high priority at all NCO levels. In the view of the panelists, assessment of this skill should be incorporated in all NCO promotion systems, from top to bottom.

Among the KSAs that were given low priorities for AXXI NCOs, the panelists were most consistent in placing Cultural Tolerance, Adherence to Regulations, and Military Presence in the third tier. The basic technical knowledge domains (e.g., electronics, mechanics) were also placed in the third tier.

Future KSA Priorities for Battle Force NCOs (AA2010)

Reflective of the forecasted changes in performance requirements, the KSA priorities for this target group were significantly different from those for the AXXI NCOs. In addition to Judgment/Decision Making Skill and General Cognitive Aptitude, which were critical for AXXI NCOs as well, a broad knowledge of the functional integration of future battlefield systems, information management, physical fitness, emotional stability, self-management skills, and adaptability were given very high priorities. Traditional leadership skills and MOS specific knowledge and skill were forecasted to become relatively less important. Battle Force NCOs must function as generalists with broad skills and knowledge of battlefield systems in a stressful and rapidly changing environment that requires emotional stability, physical fitness, and high adaptability.

Assessment Methods

It was outside of the scope of this project to determine assessment methods that are the most suitable for measuring critical AXXI and AA2010 KSAs and which make the most sense for incorporating into future Army enlisted selection and promotion systems. Some effort was given,

however, to exploring the options that might be considered and issues associated with choosing from among them. We begin this section by briefly reviewing the current Army enlisted selection and promotion systems, then turn to a discussion of assessment method evaluation criteria and factors affecting the feasibility of implementing various methods into these systems. The remainder of the section discusses the results of our efforts to identify some of the more innovative measurement methods that have started appearing in operational assessment systems elsewhere and in the research literature.

Overview of Current Army Assessment Systems

A brief overview of the Army's current selection and promotion systems is provided below. This discussion does not include special purpose assessment systems, such as that for selection into the Special Operations Forces.

Enlisted Entry-Level Selection

To be qualified for initial enlistment into the current Army, applicants must meet a number of eligibility criteria, including:

- Age – Non-prior service individuals must be between 18 and 34 years to be eligible.

- Physical standards – Recruits must meet standards for height, weight, blood pressure, vision and hearing, and test negative for drugs, alcohol, and the Human Immunodeficiency Virus (HIV).

- Moral standards – Individuals must undergo a recruiter interview, a police records check, and an Entrance National Agency Check (ENTNAC).

- Trainability – As evaluated through a standardized cognitive test battery.

The U.S. military services all use the ASVAB to screen applicants. The ASVAB consists of ten subtests (listed in Table 33) that reflect "subject areas which have shown validity through prediction of training criteria…" (Eitelberg, Laurence, Waters, & Perelman, 1984). More specifically, to be eligible to enlist, one must score within a standard range on the Armed Forces Qualification Test (AFQT), an aptitude composite of the ASVAB. The AFQT is a combination of the Word Knowledge, Paragraph Comprehension, Arithmetic Reasoning, and Mathematics Knowledge subtests. AFQT scores must fall within Test Categories I-IV (see Table 34), and every effort is made to enlist individuals who score above the 50th percentile (Test Categories I-IIIA). A high school diploma or equivalent is also required, depending on the Test Category in which they score (DA, 1999).

The goal for the Army is to identify recruits who have a relatively high probability of doing well (Eitelberg, 1988). "Applicants for enlistment in the modern military must be able to meet the minimum standards that gauge their relative chances of success or failure in training as well as their general capacity to stay out of trouble, follow orders, and complete a term of service" (Eitelberg, p. 20).

Table 33
Armed Services Vocational Aptitude Battery (ASVAB) Subtests

Subtests
*Word Knowledge
*Paragraph Comprehension
*Arithmetic Reasoning
*Mathematics Knowledge
General Science
Auto and Shop Information
Mechanical Comprehension
Electronics Information
Numerical Operations
Coding Speed

*Denotes the four subtests that comprise the Armed Forces Qualification Test (AFQT).

Table 34
Percentile Categories for the Armed Forces Qualification Test

Category	Percentiles
I	93-99
II	65-92
IIIA	50-64
IIIB	31-49
IV	10-30
V	1-9

Over the last 20 years or so, the basic content of the ASVAB has remained essentially unchanged (Maier, 1993). In 1989 the computation of AFQT was changed to incorporate the Mathematics Knowledge subtest in place of the Numerical Operations subtest. Other than this minor change in the use of the ASVAB for selection, however, most R&D effort has been directed at developing and implementing a computerized adaptive version of the test (CAT-ASVAB). CAT-ASVAB is now operational at the Military Entrance Processing Stations (MEPS). The paper-and-pencil examination is still being administered at the Mobile Examining Team Sites (METS) and in the high school ASVAB testing program.

The Project A research program also developed and validated a number of tests that could be used to supplement the ASVAB for enlistment screening. One of these tests, a measure of spatial orientation (Assembling Objects), is being administered to applicants who take CAT-ASVAB at the MEPS, but is not being used operationally.

There have been discussions among Department of Defense (DoD) and service representatives to make other modifications to the ASVAB. For example, some stakeholders are interested in deleting the two speeded subtests (Numerical Operations and Coding Speed). There has also been some very limited discussion about introducing a test of computer literacy. To date, none of these proposals for change have been adopted.

Enlisted Soldier Promotion Systems

An understanding of how the enlisted promotion system currently functions, particularly as applied to those in the NCO ranks, is essential to consideration of future changes or supplements to that system. Basic to the understanding of the enlisted promotion is that there are three different types of systems: decentralized, semi-centralized, and centralized. In the decentralized system all the promotions are controlled and administered within the soldier's unit. The decentralized system applies for promotion to Private (E2), Private First Class (E3), and Specialist (E4). The semi-centralized system applies to soldiers being considered for Sergeant (E5) and Staff Sergeant (E6) promotions. In the semi-centralized system, all promotion procedures are conducted in the soldier's unit but DA determines how many soldiers from each MOS get promoted and when those promotions occur. In the centralized system, all promotion procedures, as well as the authorization of promotions, occur at DA level. This system applies for promotion to Sergeant First Class (E7), Master Sergeant (E8), and Sergeant Major (E9). For a comprehensive overview of all of these systems, see Appendix D. The two promotion systems that are most relevant to this study are the semi-centralized and centralized systems since they address promotion of NCOs (E5 through E9) as opposed to the decentralized system, which addresses junior-enlisted promotion.

The semi-centralized system uses the standard *Promotion Point Worksheet (DA Form 3355)* forms that list predetermined promotion point factors. With a possible total of 800 points, the worksheet covers six areas of performance: Duty Performance (200 points), Awards and Decorations (50 points), Military Education (150 points), Civilian Education (100 points), Military Training (100 points), and an Appearance before a Promotion Board (200 points). All soldiers recommended for promotion must appear in front of a local promotion board. Board members may ask questions and may review the soldiers' records to make decisions regarding point assignments on the worksheet. Cutoff scores are determined each month by Department of Army Headquarters (HQDA [DA, 1999]).

In the centralized promotion system, all processing is done at HQDA level and promotion evaluation is done by an Army-wide centralized board, based only on the soldier's official military records. Boards are constituted by the DCSPER on an as-needed basis. Each board is headed by a general officer and is composed of both officer and NCO members. Records available for board review include all administrative data on the soldier such as date and place of birth, height and weight, dates of service, history of assignments, military schooling, promotion records, and civilian schooling. Also available to the board is a record of awards and decorations, Article 15s, court-martial records, letters of reprimand, course completion certificates and transcripts, and the individual's evaluation reports (NCOER).

Measurement Evaluation Criteria and Implementation Feasibility Issues

Regardless of whether one is concerned with Army selection and promotion or some other system, there are a variety of factors that should be considered when evaluating a given assessment instrument (or assessment method) for possible implementation. Certainly these factors, as well as factors that bear upon the feasibility of successful implementation, should be considered early in the decision-making process—before much time and money is spent in R&D.

Table 35 lists 15 criteria that should be considered when evaluating the suitability of a particular measurement instrument or method. The list was based on the Project A research program (Peterson, 1987), and has been supplemented with input from the Psychologist Panel. The criteria have to do with psychometric considerations (e.g., reliability, validity), operational characteristics (e.g., administration and maintenance costs, resistance to compromise), and effects of use (e.g., test fairness, utility). These are fairly standard considerations for selecting among assessment methods, regardless of setting.

Table 36, in contrast, lists some of the operational, technical, and political issues bearing on the feasibility of making changes to the Army's assessment programs in particular. This list is included because highly competent researchers who usually pay attention to the considerations in Table 35, often neglect to give sufficient attention to the types of considerations listed in Table 36. Waiting to turn one's attention to some of these concerns until fairly late in the R&D process can be a costly oversight.

The operational constraints on the Army's assessment programs are driven first and foremost by the large volume of individuals that must be assessed, both for initial entry into the Army as well as for promotions. To enlist approximately 90,000 soldiers per year, the Army screens several hundred thousand prospects. Moreover, at any time there are roughly 81,000 NCOs on the semi-centralized promotion list and 15,000 NCOs on the centralized promotion list. About 33,000 enlisted persons are promoted into E5 to E9 positions each year.

The other most significant operational constraints derive largely from the high testing volume. The large numbers of individuals who need to be evaluated for selection or promotion (as well as other practical considerations) impose limits on the time that can be devoted to testing. These conditions also constrain the administration and scoring costs that can be incurred per individual and make it difficult to place limits on the number of locations where tests or other assessments can be administered.

Table 35
Evaluation Criteria for Assessment Instruments/Methods

1. Discriminability – extent to which the measure has sufficient score range and variance (i.e.,, does not suffer from ceiling and floor effects with respect to the applicant population).

2. Reliability – degree of reliability as measured by traditional psychometric methods such as test-retest, internal consistency, or parallel forms reliability.

3. Criterion-Related Validity – the level of correlation between the predictor and measures of job performance, training performance, and turnover.

4. Construct Validity – the amount of evidence existing to support the predictor as a measure of a distinct construct (e.g., correlational studies, experimental studies, etc.).

5. Consequential Validity – extent to which use of the assessment does not have unintended negative consequences.

6. Face Validity/Applicant Acceptance – extent to which the appearance and administration methods of the predictor enhance or detract from its plausibility or acceptability to lay persons as an appropriate test for the Army; includes consideration of whether the content of the assessment might be viewed as an invasion of privacy.

7. Differential Validity – existence of significantly different criterion-related validity coefficients between groups of legal or societal concern (i.e., race, sex).

8. Group Score Differences – extent to which there are mean and variance differences in scores across groups defined by age, sex, race, or ethnic groups.

9. Test Fairness – degree to which slopes, intercepts, and standard errors of estimate differ across groups of legal or societal concern (i.e., race, sex) when predictor scores are regressed on important criteria (e.g., job performance, turnover, training).

10. Generality - extent to which predictor measures a fairly general or broad ability or construct.

11. Overall Usefulness for Predicting Army Criteria – extent to which predictor is likely to contribute to the overall or individual prediction of criteria important to the Army (e.g., absence without leave, drug use, attrition, unsuitability, job performance, and training).

12. Consistency/Robustness of Administration and Scoring – extent to which administration and scoring is standardized; ease of administration and scoring, consistency of administration and scoring across administrators and locations.

13. Resistance to Compromise – extent to which test content could be easily leaked to examiners or test responses could be faked by examinees.

14. Operational Costs – costs associated with administration; frequency and difficulty of developing alternate forms and the costs associated with this activity.

15. Utility – extent to which use of the assessment has an impact on performance that outweighs the costs associated with its use.

Table 36
Factors Bearing on Changes to Enlisted Personnel Selection and Promotion Systems

Operational
- Large volume assessment
- Limited assessment time
- Constant testing
- Dispersed assessment
- Limits on costs that can be paid for administration and scoring
- Service-specific entry testing feasible, but not desirable

Technical
- Difficulty gaining sufficient incremental validity over the Armed Services Vocational Aptitude Battery (ASVAB)
- High false rejection rates unacceptable
- Impact of labor market conditions (what will have incremental validity over ASVAB, how high the bar can be set for a predictor, pay for comparable jobs in civilian sector)

Political
- Different agendas/priorities across the services and the Department of Defense (DoD), which affects support and/or participation in innovative entry testing efforts
- Limited personnel and funding to support validation research
- Stakeholder support (military, public, and applicants)
- Promotion system has not changed significantly for a very long time and is plagued by administrative problems – will likely be considerable resistance to change

Although not a constraint on feasibility per se, the strong validity of the ASVAB for entry-level selection makes it difficult for other methods to demonstrate sufficient incremental validity to justify their implementation. Other technical constraints on the feasibility of implementing another high quality measure into the Army's entry-level selection system include the unacceptability of high false rejection rates and the impact of labor market conditions. In today's tight labor market, many employers are dissuaded from using sophisticated applicant screening procedures because they cannot afford to turn away anyone who might actually be able to perform the job if given the chance to do so (SHRM, 1998), and this appears to be true with the Army as well. False negatives are considered much worse than false positives in this environment. Other labor market conditions that affect the utility of a selection process include the extent to which the characteristics being selected for exist in the market (e.g., if the standard for a given KSA is set relatively high, there may not be enough people in the target labor market to meet that standard) and the extent to which the Army is competing with other employers that might pay more for similar skill sets.

Political constraints on the introduction of changes to the Army's selection and promotion systems are formidable. These are mammoth systems that have many stakeholders both within and outside the Army. Entry-level selection systems are operated in conjunction with the other military services and DoD. Other interested parties include the public, Congress, and the

enlistment applicants, themselves. In order to be successful, changes to the system must address the needs of each of these constituencies or at least not unduly conflict with those needs. Otherwise, the resistance to change will be strong.

Although the Army's promotion systems may not have as diverse a set of stakeholders as the enlistment selection system, these systems have remained relatively unchanged for decades. This fact in and of itself is likely to make those systems difficult to change in significant ways. The principle of inertia is a strong one. Moreover, the Army's promotion processes have been plagued with administrative difficulties for some time. Such difficulties absorb the attention of those tasked with running these systems and are likely to make them resistant to introducing changes that might make things even more complicated. A clear implication of this situation is that those involved in the current system should be part of any efforts to change the system, or they can be expected to object to the changes. Moreover, if those who operate a system think it will not work, chances are that it won't.

Innovations in Measurement Methods

To further assist ARI in the consideration of how to translate the findings of this project into R&D plans to support the selection and promotion of 21st century soldiers, the project team developed a listing of potential methods for the assessment of individual characteristics (predictor variables) that could be measured at the time of enlistment or promotion. The listing is not meant to be comprehensive, but rather the emphasis is on experimental or new methods. Relatively little attention is given to the well-known methods (e.g., personality and interest inventories, paper-and-pencil tests of cognitive aptitudes). The following discussion attempts to make a clear distinction between the construct, variables, or individual attributes to be measured and the measurement operations used to make the assessment.

Table 37 shows the list of measurement methods that was generated. The list was initially drafted by project staff based on our experience and prior knowledge of the literature, supplemented by reviews of recent journals and professional conference programs. We then conducted telephone interviews with I/O psychologists representing a broad range of industry, federal government, and consulting organizations. A total of 13 individuals were interviewed. Interviewees were given the opportunity to review and add to the initial draft of measurement methods. The list was revised following the telephone interviews, and then was reviewed and revised again based on input from the Psychologist Panel.

The self-report measurement methods topping the list have been used to assess temperament/personality, as well as other characteristics such as work/life values, integrity, motive strengths (e.g., need for achievement, risk aversion), and goal orientation. Efforts to collect self-descriptive information that minimizes the extent to which respondents can misrepresent themselves are listed next. The list includes the Army's Assessment of Individual Motivation (AIM) that is scheduled to be used as part of an operational test for selection decisions involving applicants without a high school diploma starting October 1999. This section of the list also includes the Conditional Reasoning Test, which uses items that appear to be evaluating judgment skills to assess underlying personality characteristics (e.g., need for achievement [James, 1998]).

Situational judgment tests (SJTs), both multiple-choice and free response formats, come next on the list. SJTs are particularly useful for assessing higher level cognitive skills related to judgment and decision-making. The more elaborate SJTs that are coming on the scene, such as those using interactive video (CD-ROM or DVD), become fairly indistinguishable from job sample simulations. More often, however, it is the other somewhat less extravagant delivery methods that are being increasingly used (e.g., video and/or computer delivery). Note that the well-researched and highly regarded situational interview (Latham, Saari, Pursell, & Campion, 1980) is included in this category.

Another set of self-report methods, this time focusing on the individual's work history, is listed next. This includes fairly traditional methods, including accomplishment records, structured applications, and experience checklists, that have not been widely used in Army enlisted assessment systems. Such methods provide a fairly simple alternative for capturing relevant information, particularly for promotion systems. New methods for the automated scoring of textual responses (e.g., accomplishment records, essay tests) may make some assessment alternatives such as these more suitable for meeting large volume assessment needs.

The next series of items in Table 37 refer to various types of job simulations – assessment centers, mini training programs, and job samples. Full-scale 1-2 day assessment centers are becoming the exception rather than the rule according to our industry interviewees. Rather, organizations are opting for streamlined assessment centers that include perhaps two or three exercises, some of which might be delivered from a distance (e.g., by phone or the Internet). Mini training programs refer to situations in which individuals are given limited job training and assessed on the ability to successfully apply that training in realistic job samples. This model has been used to select from among applicants for highly skilled occupations, such as air traffic controllers. Job samples, ranging for low to high fidelity, can be used to assess ability to do the job more or less directly. For selection and promotion, one must take care that the job samples do not require behaviors that candidates have not had the opportunity to learn. It is also important to assure that job samples adequately sample the domain of critical work behaviors.

The list concludes with methods that can be used to assess prior or current performance. It includes various rating methods, the notion of portfolio assessment that is so popular now in educational measurement, and scored performance on actual work activities.

Some Examples

Our telephone interviewees offered a number of specific examples of innovative assessment operations. Several individuals mentioned computerized simulations, of varying levels of fidelity and bandwidth. These included simulations for specific skills assessment (e.g., programmer, plumber), judgment and decision making (with domain specific situations), and problem solving (for domain specific, ill-structured problems). Specific methods included computerized presentation of still pictures and written text and interactive CD-ROM based presentation of problem situations in which test takers can click on icons, objects, or individuals to obtain closer views or additional information. Another example was a high fidelity, virtual-based simulation of situations or problems (e.g., a plumber facing frozen water pipes).

Table 37
Potential Innovative Measurement Methods

Self-Report
    Standardized self-descriptions via inventory or questionnaire (paper-and-pencil, Internet, telephone)
    Alternative methods for self-description
        Forced choice or quasi-ipsative scaling (e.g., Assessment of Individual Motivation [AIM])
        Unobtrusive or disguised self-report (the Conditional Reasoning Test)
        Context-specific temperament/personality items
        Biodata
    Performance based standardized skills assessment
        Noncomputerized standardized tests (e.g., ladder climbing for fire fighter applicants; physical
            endurance tests).
        Computerized tests (e.g., Project A psychomotor tests)
    Situational judgment tests - Multiple choice format
        Paper-and-pencil
        Computer administered (text and perhaps still pictures)
        Video portrayal
        Interactive video/CD-ROM
        Internet or phone delivered
    Situational Judgment Test (SJT) - Free response
        Oral response (e.g., situational interview; may be phone delivered)
        Written response (includes essay test; might include automated scoring)
    Standardized description of work/experience history
        Accomplishment record
        Structured questionnaire (e.g., the standard application blank)
        Questionnaire checklist (i.e., a large a priori list of "experiences")
Job Simulations
    Assessment Centers
        Full version
        Mini assessment center
        Delivery via phone, personal computer, or Internet
    Mini training program (i.e., two days or less)
    Job samples/simulations
        High fidelity (e.g., airline cockpit)
        Moderate fidelity (Project A hands-on, Air Force walk through; oral boards)
        Low Fidelity (hypothetical "talk through")
Prior or Current Performance
    Assessment of prior performance using standardized appraisals
        Giving rating scales to current or previous supervisors or co-workers
        Portfolio assessment
    Assessment of current performance
        Peer or "other" descriptions (e.g., 360° feedback)
        Scored performance on actual work tasks recorded via videotape or other device
        Behavior description interview (Rater describes individual using open response or checklist.
          An a priori scoring system developed through previous scaling research is applied)

An interesting example of assessing current performance was based on semi-structured group discussions of actual problems and issues faced by the organization. Videotapes of the discussions are scored on dimensions of performance. A strategy for assessing prior performance involved the use of a Career Achievement Record that is scored using behaviorally anchored rating scales.

One interviewee provided an example of an innovative combination of methods. The assessment begins with an interactive voice recording delivery of a biodata checklist via the telephone. Using an automated process, responses to the checklist are then used to create a structured interview that is given by a live interviewer via the telephone. The interview is used to follow up on the endorsement of low base rate or high value items on the checklist.

Some of our interviewees also mentioned novel strategies for using assessment information. These included the use of a neural-network modeled match of competency profile with job competency requirement profiles and a Q-sort based match of applicant values with organizational values.

Trends in Personnel Testing

We also asked our telephone interviewees to comment on trends they see in personnel testing. One trend mentioned by several interviewees is the increased use of technology (e.g., computers, telephones, Internet) for the delivery of assessments. This trend is reflected in the list of measurement methods provided in Table 37. There were also observations suggesting that organizations are returning to basics, asking for shorter and cheaper assessments. This, along with an apparent decreasing concern for adverse impact issues by many employers, is leading some back to the use of multiple-choice tests and other traditional assessment methods that can be easily administered using either paper-and-pencil methods or advanced technologies. This trend may also reflect the realization that personality testing and moderate to high fidelity simulations are not the panacea that people had hoped. Personality measures still tend to suffer from applicant misrepresentation and simulations have not always shown the increases in validity (and decreases in adverse impact) that would justify their continued use. Although this certainly does not mean that no one is pursuing these methods, it does suggest a slowing of the bandwagons.

Several interviewees also mentioned a shift in emphasis from selection to recruiting and performance management. This appears to be at least in part a response to the dwindling pool of qualified individuals in the work force. Another observation that has some relevance to the Army was an increasing concern for testing individuals for whom English is a second language. Given that the percentage of individuals in the applicant population for whom this is an issue is steadily increasing, this is an important consideration for any future-oriented assessment system.

Developing Assessments for Future Jobs

A final question posed to our telephone interviewees asked whether they have been involved in the development of assessments for jobs that do not currently exist. One person described an effort to conduct a future-oriented job analysis for about 20 occupations in a single organization. In a series of workshops, SMEs described anticipated changes to the target jobs and rated those

changes with regard to their expected timing (within 1, 5, or 10 years). There was an effort to assure that changes to selection systems would not get too far ahead of the timing of the anticipated changes. The process suggested fewer major job changes than had been expected by organizational decision-makers.

We also spoke to the representative of a consulting firm whose clients often use the opening of a new plant or office to try out new management structures. Jobs are defined based on management's vision of how the new plant will operate. Consultants then work with management to infer KSAs based on these anticipated jobs. A significant problem that frequently occurs with this process, however, is that the plant does not operate as intended (e.g., it is more hierarchical than team-based). This can result in a mismatch in the types of employees who were selected and the types of individuals who, in retrospect, would have been more successful in the actual environment that was created.

Still another interviewee pointed out that, in industries that are rapidly changing (e.g., telecommunications, computers), it may be best to stick, inasmuch as possible, to assessments of generic aptitudes (e.g., cognitive, psychomotor, communication) to avoid the problem of the assessments becoming obsolete too fast.

There were several other examples provided. A distinct theme from our discussions, however, was the need to be creative in obtaining informed speculations about future jobs and, perhaps even more importantly, the caveat that all the speculations will not necessarily come true.

CONCLUSIONS

At this point, we must remember that the results of this project are projections about the future, and the future is always, to some degree, uncertain. Another issue concerns whether the result would be the same if the project were repeated with another sample of Army SMEs and another sample of psychologists. That is, is there serious sampling error to contend with? Unfortunately, there is no readily computable sample statistic that adequately reflects the desired portrayal of KSA priorities. In lieu of being able to calculate the standard error of a set of priorities, we would argue that, while there would most likely be some sample to sample differences of variable placements in the overall picture of KSA priorities, the current results show very meaningful patterns across target groups and across the two expert panels. Consequently, it seems unlikely that another set of highly selected expert judgments would produce a qualitatively or substantially different picture.

Given some confidence in the results, what are the overall implications for KSA assessment for the target groups? We think the following should be considered:

- Consistently, very high priorities were ascribed to two major dispositional variables, each of which can be assessed either within the context of personality/temperament assessment or as "will-do" components of performance that the personnel system rewards. The first variable is called conscientiousness or dependability from the trait perspective and is labeled as personal discipline and integrity in the performance domain. The second variable reflects achievement striving, initiative, energy and effort and the same two measurement options apply. The measurement of these two variables from either the trait or performance factor perspectives presents certain measurement problems (e.g., response distortion, rater leniency). However, given their judged future criticality both for first tour selection and for NCO promotion, they seem worthy of significant future research investments. To a certain extent, the same can be said for emotional stability, given its judged criticality for AA2010.

- In addition to the two KSAs discussed above, high priorities for NCO promotion are also ascribed to prior performance factors having to do with MOS-Specific Knowledge and Skill and several facets of leadership/supervision. It will not be an easy task to develop assessment procedures for these variables and adapt them for use in NCO promotion systems. However, given their perceived importance, these KSAs should not be ignored and are deserving of considerable R&D attention.

- The generally high priority given to General Cognitive Aptitude implies that the judges believe that, even for the more highly selected NCO levels, there is sufficient variability in this KSA to warrant consideration for assessment as a promotion requirement.

- For first tour selection, trying to reduce the disparity between new recruit and Army values and ethical principals is given a very high priority. Even if an individual's value orientation can be modified by training, the training outcome would be easier to achieve if selection could be based in part on a values match. A number of large private sector organizations believe this to be true and have developed instrumentation for assessing the degree of such a person/organization match. A determination of the feasibility of doing so in the Army context should be given careful consideration.

- Self-Management Skill and, to some extent, Self-Directed Learning Skill, also receive high priorities. While the Army already devotes considerable attention to the development of self-management skills during the first tour of duty, the implications of the current findings are that it will become critical at all levels in the future. There is also an implication that a much higher level of such skills will be required. Developing fuller specifications for what self-management might entail in the future is a worthwhile research objective.

- Three general skills, Oral Communication, Judgment and Decision Making, and Adaptability, are all given high priorities, although the pattern across the target groups is not the same for each of the three. Oral Communication is ranked as highly important from top to bottom, while Adaptability is given a high priority only for Battle Force NCO. Incorporating assessments of Oral Communication Skill in the promotion systems is probably a relatively simple matter compared to the specification and measurement of Judgment/Decision Making and Adaptability. In this regard, and because of previous ARI sponsored research, developing measurement methods for the adaptability construct is farther along. However, given very high priorities for Judgment/Decision Making, perhaps research on this construct as a KSA should also have a high priority.

- Finally, for senior-level NCOs, and particularly for Battle Force NCOs, critical KSAs focus on management of information systems and having expert knowledge of how the battlefield systems of the future will interact and be coordinated. Developing procedures for assessing these KSAs must deal with the fact that the systems being talked about do not yet exist. However, something reasonably similar may exist in one or more Army units at some point not too long from now (or reasonable facsimiles may exist already). One aspect of R&D on these KSAs is the premium to be placed on choosing the right surrogate.

In sum, we think the outcome of the current project captures meaningful priorities and points toward a number of very promising R&D objectives. When the project began, opinions varied about what could be learned from this "judgment capturing" exercise. It may, in fact, have exceeded expectations. Armed with this information, an understanding of the current selection and promotion systems and the context within which they operate, and a toolkit of innovative measurement methods to consider, Army researchers should be able to make well-reasoned recommendations regarding how to best meet enlisted soldiers' requirements, throughout the ranks, in the 21st century.

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Appendix A

Factors that May Influence the Future Army: 2000 - 2025

This appendix is a review of literature on large scale conditions that are likely to have an impact on the work of soldiers in the future. These conditions include the (a) officially identified national interests, (b) world population, (c) geopolitical setting, (d) physical environment, (e) population of the United States (U.S.) and its youth, (f) American public's support for the military, (g) media, and (h) advances in science and technology. Implications for the work of future soldiers are drawn.

For this view of the global conditions, we have relied very little on the work of specialists in futurism. Futurists are often unclear about distinctions among probabilities, possibilities, conceivabilities, and desirabilities. Many futurists' rhetoric inspires skepticism, while the more sober futurists acknowledge that many important outcomes will be determined by complex interactions of unpredictable forces. Because the predictions of futurists are too numerous to summarize and evaluate, we have confined this review to macro influences on the Army whose effect seems, at this point, to be likely.

U.S. National Interests

The Army is an instrument of national security policy that has the role of protecting vital and important national interests. The vital interests (Deputy Chief of Staff for Doctrine [DCSDOC], 1997a) are:

- Deterring, reducing the threat of, and preventing nuclear, biological, and chemical (NBC) attack on the U.S. and its allies;

- Preventing the rise of powerful, hostile hegemonies in Asia or Europe; and

- Maintaining continued unhindered access by the U.S. and our allies to global resources that are essential to our economic health, including energy sources.

Important interests include:

- Preventing the development of a hostile hegemony in Persian Gulf;

- Maintaining the peace and security of the Korean Peninsula, Taiwan, and the South China Sea; and

- Combating terrorism, drug trafficking, and trans-national crime.

United States interests will remain worldwide and will cover many dimensions of the strategic security environment (U.S. Army Training and Doctrine Command, 1994). The course of geopolitics is in the hands of large numbers of players at many different levels, including international organizations (e.g., Organization of Petroleum Exporting Countries [OPEC], United Nations[UN]), more than 180 nations, and many other mechanisms, groups, or areas (e.g., the physical environment, world population, computer hackers, drug cartels, the International Islamic Front, Kashmir). At the same time, advances in the sciences and technology will continue to alter

the world of our daily lives at a pace that will feel rapid. Which players or factors will have a discernible impact on the work of soldiers? Here we can take only a short step toward answering that question.

World Population

The population of the world has significant implications for the future Army. By 2025, the world will contain between 7.9 and 9.1 billion humans, according to UN estimates (Microsoft, 1998). Most careful forecasts do not have the earth's population leveling off until after it doubles today's size, and some such forecasts see vastly larger increases (McKibben, 1997). By 2025, an estimated 62% of the world's population will live in cities. Already by the year 2000, there will be 24 cities in the world with over 10 million inhabitants (Dator, 1994). Since cities are centers of industrial, economic, and political power, the ability to control them without destroying them will be increasingly important to military and political success.

Some projections about the distribution of the world population are significant, particularly its political control by the world's civilizations[1] (Table A-1) and attitudes toward our Western civilization. Worldwide, Moslems are expected to increase their share of the human race from 18% in 1980 to 30% in 2025. They will control a broad expanse of the earth from northern Africa east to the southern tip of the Philippines. The U.S. will continue to be heavily dependent on imported fuel that originates mostly in the Islamic world (Osborne, 1991a).

Table A-1
Proportions of World Population Under the Political Control of Civilizations

	Civilization				
Year	Western	African	Chinese	Hindu	Islamic
1900	44.3	0.4	19.3	0.3	4.2
1990	14.7	8.2	24.3	16.3	13.4
2025	10.1	14.4	21.0	16.9	19.2

Note. The Latin American civilization is predicted to hold steady from 1990 to 2025 at 9.2%. Other civilizations having less than 9% in the 2025 projections are not included here (Excerpted from Huntington [1996, p. 85], whose main sources were UN reports and the *World Almanac).*

Geopolitical Setting

By 2025, the geopolitical setting could take any of several very different forms, ranging from chaos, through the replacement of nation states by other political entities, to a form similar to today's. Even among Army futurists, the set of possible scenarios differs (Metz, 1997; Orvis, Nichiporuk, McDonald, Quigley, & Sastry, 1998).

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[1] For a discussion of the concept and geopolitical significance of "civilizations," see Huntington (1996).

Huntington (1996) cites Henry Kissinger's observation that world politics in the 21st century will be dominated by six major powers: the U.S., Europe, Russia, China, Japan, and probably India. In addition, the Islamic countries, which have not had much success to date in putting together a single, joint program, will nevertheless be influential because of their strategic locations, large populations, and oil resources. "In this new world, local politics is the politics of ethnicity; global politics is the politics of civilizations. The rivalry of the superpowers is replaced by the clash of civilizations" (Huntington, 1996, p. 28). Huntington's concept of civilizations is important here, because the two most populous civilizations, the Islamic and Chinese, both have an antipathy to Western culture, a resentment of Western influence, and a desire to establish their own influence. Violence between Moslems and non-Moslems has occurred on-and-off almost since the origin of Islam (Huntington, 1999).

Military writers appear to have adopted Huntington's concept of "fault line conflicts" in anticipating trouble spots. "*Fault line conflicts* occur between neighboring states from different civilizations, between groups from different civilizations within a state, and between groups which...are attempting to create new states out of the wreckage of old" (Huntington, 1996, p. 208). "Tensions will occur—primarily along fault lines. Security and stability will depend on managing tensions to avoid wars" (DCSDOC, 1997b, p. 11). Most likely, the places inviting military attention will be the west Pacific rim and west/southwest Asia. Sparks for war could come from ethnic hostilities, conflicts of economic interests, rich-poor tensions, and attempts of nations to enlarge their boundaries.

Whereas Orvis et al. (1998) propose a unique package of U.S. military forces for dealing with each of their different geopolitical scenarios, Army planners expect the U.S. to face a variety of threats that cut across scenarios. In the near term environment (roughly out to 2010), the expected scenario includes regional competitors with industrial age forces, limited weapons of mass destruction, selective precision in delivery, and a quasi-professional military that would meet our force "asymmetrically" (DCSDOC, 1997a). Asymmetry refers to opposition forces not trying to match our ways and means of war, but rather trying to equalize the military balance by using other, partial approaches, such as terrorism, hostage taking, exploiting niche weapons (e.g., biologicals), knocking out our space assets, using human waves, or using limited nuclear weaponry.

Out of the near term military environment, a different one will emerge. One or two major competitors could arise who will also try to counter our capabilities asymmetrically, rather than match them system-for-system. Such competitors will have a professionalized military, a capability for mass precision delivery of weapons, and abundant weapons of mass destruction. Off-the-shelf information technologies will probably be sufficient to keep their otherwise low-technology forces effective in pursuing regional ambitions and posing a limited global threat.

With their precision delivery capabilities, major competitors will try to keep the U.S. from achieving decisive outcomes quickly in wartime. They will rely most heavily on land power, drawing on the advantages of large population, the strength of a defensive position, and the unity of an ideology (Scales, 1998a). "When states from different civilizations are involved...cultural differences sharpen the conflict" (Huntington, 1996, p. 208). Along with these possible maximal

threats, a full range of lesser military threats will continue to exist. Stability and support operations (i.e., peacekeeping) will be necessary for a long time as local and regional conflicts ignite.

Toffler and Toffler (1998) see the future sources of conflict as more complex and dynamic than the largely religiously defined civilizations of Huntington. Both between "waves" (agrarian, industrial, and information age) and within, the Tofflers see conflict arising in any or all of these dimensions: cultural, religious, social, political, economic, and military. Surely these dimensions are highly correlated, but there is the new possibility of military/political conflict cutting across Huntington's civilizational lines and waged by combinations of criminal cartels, non-governmental organizations, ethnonationalists, militias, cults, international corporations, and nation states (Arquilla & Ronfeldt, 1997). The activities of such organizations as Columbian and Mexican drug cartels, Russian mafias, Hamas, the International Islamic Front, and Aum Shinrikyo, may, on a small scale, foreshadow that era of international relations. The durability of the Columbian drug trade to date gives a clue to the intractability of a networked enemy. When that era will emerge on a large scale is hard to predict, but much future conflict will not resemble traditional military activity. In the future era, opponents will not necessarily have to win a war with the U.S. to be successful; rather, a stalemate could attain their objectives. Already, reports of attacks on U.S. government web sites are common; the Federal Bureau of Investigation (FBI) shut down its visitor tour in Washington in the summer of 1998 owing to threats of terrorism; the ease of one person or one vehicle tying up rush hour traffic is manifest almost daily; and the presence of large, vulnerable crowds at sporting events or urban settings is the other edge of the sword for an open society.

For military actions in the future, the lineup of U.S. allies will probably vary. Late in the 20th century, major American military action was usually constrained by the political need to win the approval of UN or NATO and the budgetary need to get other countries to help pay the bill. Building approval and coordinated action within the large alliances has not been fast or easy.

A different, more flexible future is anticipated: "[AA2010] research indicates that while the current multipolar international security system will continue largely intact, tomorrow's world will become increasingly complex, characterized by shifting balances within regions and the prevalence of ad-hoc security structures, vice stable alliances" (DCSDOC, 1998c, p. 1). Army writings on the future repeatedly refer to situational U.S. coalitions with a very small number of nations to deal with problems of common interest or to gain overflight and staging privileges (DCSDOC, 1998c). Such coalitions are a prerequisite for Army doctrine, which emphasizes speed of action and preemption.

One current development could have a major impact on geopolitics and the activity of the future Army: the new willingness of the larger world community to take action in response to suspected violations of human rights that used to be considered the internal affairs of other countries. Two current cases involve General Pinochet, former ruler of Chile, and Yugoslavia. Vaclav Havel (1999, p. 4) writes "... in [today's interconnected] world, the idol of state sovereignty must inevitably dissolve." In parallel, Secretary of State Albright (1999) has

acknowledged that the world community "...is moving in a direction where there is a sense of co-responsibility...for what happens inside [other nations] (p. 5)."

Just how this "sense of co-responsibility" will play out is unpredictable, but two opposite scenarios can be imagined. At one end there could be an increase in internationally sponsored military interventions against large-scale violators of human rights. One of the unknowns under this scenario is how international law on the subject will develop. At the other end, the frequency of crimes against humanity could decline if the punishment of perpetrators gains credibility. Establishing that credibility is likely to require at least some application of military force. For instance, in 1998-99, threats and an eventual application of force did not, for a long time, stop Milosevic's actions against ethnic Albanians in Kosovo.

Although it is impossible to predict an exact geopolitical scenario, one significant element of the geopolitical future can be predicted with confidence: other countries and interests will work to end the great imbalance in world power that now favors the U.S. (Huntington, 1999). Three means to that end are readily identifiable: proliferation of weapons technology, terrorism, and formation of coalitions against U.S. influence.

Proliferation of weapons technologies to other nations was news well before the Cox Report to Congress in May 1999 (Laris, 1999; Slavin, 1999). China's alleged intelligence collection effort in the U.S. has raised questions about the security of the design of America's miniaturized nuclear warheads (Loeb, 1999a). In the mid-1990s, Iraq acquired sophisticated guidance devices that had been salvaged from ballistic missiles in decommissioned Russian submarines (Hersh, 1999). Other possible sources and destinations of technology transfer abound, and Iraq's program of biological warfare operates now (mid 1999) free from the hindrance of international inspection. Supporting potential enemies' use of leaked technologies (e.g., for targeting) is an abundance of open source intelligence (Loeb, 1999b); for example, the openness of much of the military process alerts the world to the approach that they will face in a conflict with the U.S. Army (Scales, 1998b).

Some countries outside the Western sphere (e.g., North Korea) seek military technologies for dealing with regional threats while many others seek them to remedy their weakness vis a vis the more powerful. Such proliferation affects the U.S. in two ways. First, it shortens the time for other countries to acquire ways to neutralize our advanced military capabilities. Second, proliferation encourages conflicts between third and fourth parties that are not necessarily hostile to the U.S. but that, together, threaten world peace (e.g., nuclear arms in India and Pakistan).

Dangerous as they are abroad, warlike events are unlikely to limit themselves to foreign soil. At the intersection of geopolitics and proliferation lies a threat at home: terrorism. This issue has a current and an enduring relevance: terrorism is on the rise now (Miller & Broad, 1998), and a major justification for the very existence of government is that it keeps its citizens safe. Failing to provide public safety, a government and its benefits may not survive.

In an interview on 22 January 1999, "President Clinton said ...that it is 'highly likely' that a terrorist group will launch or threaten a germ or chemical attack on American soil within the next few years" (Miller & Broad, 1999, p. 1). Former Central Intelligence Agency (CIA) Director

James Woolsey has said that germ terrorism is "the single most dangerous threat to our national security in the foreseeable future" (Broad & Miller, 1998, p. 2). The effect of a successful biological attack can be imagined in terms of epidemics and plagues of the past.

In March 1998, a dozen Federal agencies conducted a war game to evaluate the impact of a hypothetical germ attack. Overall, the impact would have been catastrophic; the supplies, organization, and plans were not in place to assure a successful response (Miller & Broad, 1998). The exercise provided momentum for the President to sign new directives to improve the country's ability to prevent NBC attack and to respond effectively if attacked. Also, he set up a coordinator of government anti-terrorist activities. In the annual budget outlined in January 1999, the administration has asked for about $2.8 billion to counter domestic terrorism and another $8 billion for protection of American installations abroad.

The proposed bioterrorism defense program (Shalala, 1999) calls for a dramatic expansion of the infrastructure. Today, a few national-level centers fly teams to sites of emergencies. As a response to bioterrorism, that mechanism is much too slow. Instead, this program will extend into every major community in the country, rural and urban, involving hospitals, laboratories, public health workers, and physicians. Among its responsibilities will be the surveillance, tracking, diagnosis, and remediation of biological threats. In this specialized type of defense, the military will be partners with civilian agencies. By July of 1999, the military was helping to train early reaction teams in 120 cities around the country (Cohen, 1999).

The Secretary of Defense has approved creation of a joint service task force for civil support that will develop a plan for supporting Federal agencies in domestic crises (Broad & Miller, 1999). This task force will report to the Justice Department, which is the lead agency for law enforcement and for coordinating the domestic response to terrorism.

One form of biological terrorism that can be expected will be directed against food crops (Rogers, Whitby, & Dando, 1999). Advances in genetics have made it possible to develop agents that are effective against a wide variety of the world's staple crops, including wheat and rice. Because agents for such terrorism can be both developed and transported easily and unobtrusively, they could be unleashed without exposing the attacking nation, organization, or other party. One aspect of American farming practice makes the U.S. especially vulnerable to such terrorism: American farmers tend to grow a very small variety of any given food crop. If they were to diversify the varieties, then a single agent could harm less of the total national yield.

Homeland defense is one of the Army's missions (DCSDOC, 1998c). Whether it would involve a law enforcement role is to be resolved. The prospect of an emergency role for the military in law enforcement has evoked concern among civil libertarians (Broad & Miller, 1999). According to former Senator Sam Nunn, the Pentagon already has the power to carry out law enforcement activities in the event of chemical or germ attacks. Without getting into the complexities of the laws here, we can readily imagine the impetus for emergency curtailment of civil liberties by noting that American citizens have readily given up some of our freedom from searches in return for being safe from the demonstrated threat of terrorism while riding airliners. At the least, the likelihood of terrorism in the continental U.S. (CONUS) means that the military

can expect to be more active than before in disaster relief. Just how the counter-terrorism program will play out remains to be seen, but it could be large and costly enough not to reach national effectiveness until almost the midpoint of the 21st century.

The third means by which other nations may try to improve their power balance relative to the U.S. is the formation of coalitions against U.S. influence. Given that the U.S. will make use of both the major alliances (UN and NATO) and other ad hoc, situational coalitions that are outside the UN and NATO (DCSDOC, 1998c), other countries can be expected to try to do the same. Given also that there is a widespread distrust of the U.S.'s international exercise of its power (Huntington, 1999), it is likely that challenges to U.S. positions will become more common as the rest of the world, as individual countries and as coalitions, increases in power.

Physical Environment

The prospect of attacks on food crops raises the subject of the broader physical environment. The real health and productivity of the home planet is a very complex and debatable subject, with projections having to be based on numerous, arguable assumptions. On the pessimistic side of the debate, some scholars believe that the earth cannot sustain even its present population over the long run because we have used up so much of its non-renewable resources (W. Catton in *The Carrying Capacity Briefing Book* 1997, as cited by McKibben, 1997). Regardless of the details, unless the environmental costs of production can be greatly reduced, the demands of the swelling, modernizing nations on the earth's resources are likely to increase. "We are entering the zone where the world may well begin to pinch" (McKibben, p. 34). The outcome will probably be an unpredictable mixture of lowered standards of living and greater competition for the resources. Often, that competition will involve military means.

U.S. Population

As for the population of the U.S., the Census Bureau (Day, 1996) predicts that it will increase by about 23% from 1999 to 2025. The fastest growing segment of the U.S. population is Hispanic, with half of all immigrants in the country today being Spanish speaking (Escobar, 1999). From their present 11.2% in the total population, Hispanics will increase to 17.6% in 2025. At present, 9.8% of the people living in the U.S. are immigrants. Specifics of future immigration are hard to predict, but pockets of conflict elsewhere in the world will continue to produce a flow of immigrants with unique language and cultural competencies.

One change in the U.S. population that has been in the news repeatedly is the growing inequality in family income (i.e., the growing gap between the highest and lowest levels of household income). Census data on that subject (Weinberg, 1996) do not seem to have, by themselves, any clear implications for recruiting in the future era. The source of the growth in the income gap is located almost entirely in the upper 20% of family incomes; the remaining 80% have stayed in nearly the same relation to each other from the mid 1960s to the mid 1990s. Families in the top 20% of the income range are not a prime recruiting market for the military.

The U.S. youth population will remain a special concern for the Army. Recruiting and retention will be affected by the supply of young people (Table A-2), their propensity to enlist,

their qualifications, and the availability of both civilian and Army jobs. Several factors should help the Army with recruiting. First, while the size of the Army is likely not to grow, the numbers of service age youth are predicted to grow by 17% out to 2025 (Day, 1996). Second, the numbers of Hispanic youth, who have had the highest propensity to enlist of all youth in recent years (Wilson, Greenlees, Hagerty, Hintze, & Lehnus, 1998), will grow from the present 13.7% of the youth population to 21.7% in 2025. Lastly, the technical preparation of new accessions should continue to improve as information technologies become more common at home and school.

Table A-2
Changes in the U.S. Youth Population (17-24 Years) in 1999 and 2025 (From Day, 1996)

			Race/Ethnic Group			
Year	Total	Hispanic	White	Black	Native American	Asian
1900	29,711	4,095 (13.8%)	19,890 (66.9%)	4,258 (14.3%)	271 (<1%)	1,198 (4%)
2025	34,859	7,541 (21.6%)	19,218 (55.1%)	5,316 (15.3%)	353 (1%)	2,432 (7%)

Note. Numbers are in thousands; resident population. These data are from the middle of three projections in the source document. Percentages, in parentheses, are relative to the total.

In contrast, two serious influences could work against Army recruiting. The first is a possible continuation of the recent increase in new high school graduates choosing to go on in school. This trend has been abetted by the growth of other programs of support for college that match or surpass the Army's (Naomi Verdugo, personal communication, July 1999). The Active Army has competition in recruiting from even the Army National Guard, which will offset young persons' college expenses if they take part in the Guard during their college years. The expected growth in information intensive occupations along with the well publicized return on investment from education make it likely that young persons' pursuit of post-secondary education will not decline.

More worrisome is the poor state of educational achievement in America's youth: "...the average level of attainment by pupils leaving school is the worst in the industrial world" (McRae, 1994, p. 42). This finding is supported not only by head-to-head comparisons of test scores among nations (Geary, 1996; McRae), but also by foreign born students doing better in U.S. schools than home students do, and by the decline in high school students' scores on the SAT in the 1980s. The youth population's English language skills will decline, on the average, as the proportion of young Americans with other primary languages grows (Day, 1996; Grissmer, Kirby, Berends, & Williamson, 1995). Moreover, concerns about the psychological fitness for service of tomorrow's young persons extend to their stability, social adjustment, and moral/ethical development (Stehlik, 1998; Vollrath, 1997).

Young persons' preparation in new technologies will segment the youth population in new ways: by degrees of proficiency and interest, by types of user (users only versus users who also modify and create the tools), by free/rebellious spirits versus more conventional users, and by recreational versus serious users. So the pool of recruitable youth will have a much higher average level of experience and comfort with information technologies than today's, but that experience and comfort will not be uniformly useful to the Army.

The willingness of the youth population to serve is another concern. In the 1990s, young people's propensity to enlist[2] declined, as measured by the Youth Attitude Tracking Survey, also known as YATS (Lehnus & Lancaster, 1997). In the 1996 survey, the major reasons reported (i.e., each by 17% of respondents) for being less interested than before were "going to school" and "other career plans." Together, "dislike the military" and "just not interested" accounted for another 17% of respondents who reported a decline in their own interest in enlisting. The major reasons for being more interested were "money for college" (22%) and "training" (17%).

Predictions of propensity to enlist out to 2025 would have little signal and much noise, but the present trend toward personal/vocational motives and away from the institutional appeal of the military is notable. In parallel with the decline in propensity, participation in voting—a sign of civic commitment that is much less effortful than enlisting—declined from 50% among 18 to 24 year olds in 1972 to 32% in 1996 (Broder, 1999).

The decline in propensity may be abetted by "The Control Revolution" (Shapiro, 1999), a radical increase in individuals' ability, enabled by the Internet, to choose the experiences that they will have—where and when to work, what news to receive, what entertainment to receive, what to invest in, whom to communicate and share experiences with, and much more. This revolution can be seen as an instance of the *demassification* that the Tofflers (1993) proposed as a core impact of the Information Age.

This revolution seems likely to have two effects that will work against Army recruiting. First, it will tend to loosen individuals' attachment to the community and to public institutions like the Army. Second, a youth population which has grown up with such freedom may be disinclined to volunteer to work in environments offering limited personal control. What can the military offer a generation that will be able to be much of what it wants to be without the help of mass social institutions other than information providers? If this power to tailor-make one's own experience, which Shapiro (1999) calls *personalization*, is available to significant numbers of youth, but only in the middle and upper socio-economic strata (SES), will the military become a vocation of choice only for the lower SES? If so, that inequality in opportunity could distance the military from its citizen base of political power still further.

Finally, the physical suitability of the youth population is not assured. The poor fitness of Army accessions has been a problem in entry-level Army training for some years (Walker, White, & Schroyer, 1989). As for the Army's physical standards, the trend of court decisions to favor plaintiffs with various disabilities could pose a challenge (Tenopyr, 1997). It seems only a

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[2] Propensity to enlist is defined as the percent of respondents reporting that they will definitely or probably enlist in one of the services.

matter of time before persons with physical handicaps will sue to win non-deployed Army jobs that have low physical demands (e.g., the increasing numbers of jobs in information technologies). If the Army were to fill those jobs with contractors and civil servants, then the impact on uniformed fitness standards might be negligible.

In the past, Army recruiting has fared better in times of high unemployment (Peter Greenston, personal communication, July 1999), but rates of unemployment cannot be predicted accurately past 2010. Currently, the demand for people to fill high tech jobs exceeds the supply (Lane, 1998). Over the long run, the demand for information-intensive products and services is likely to increase, which will further drive up the demand for the technically qualified. Industry leaders are dubious that the American primary and secondary education system are equal to the task of producing an adequately skilled work force for such jobs (Popper, Wagner, & Larson, 1998).

Civilian employers are now trying to reduce the shortfall by hiring foreign citizens in large numbers and by lobbying Congress to ease immigration for the technically qualified. At the same time, "[n]early 47,000 Chinese students and another 11,000 scholars are studying and conducting research in the USA" (Wiseman & Bezlova, 1999, p. 5A), and only a third of the students return to China as soon as their studies are over. But the abundant supply of well educated information technologists from India, the former Soviet Union, and east Asia could dwindle if the gap between those economies and the U.S.'s shrinks.

Because many high technology positions in the future Army are likely to require special security clearances, many foreign born persons may not qualify for them, and for those who may qualify, the clearance process could take a long time. Thus the difficulty of recruiting Americans with aptitudes and interests in information technologies is likely to increase in the future.

Historically, the makeup of the Active Army has been determined much more by Army personnel policies (e.g., floors on recruiting females, incentives to enlist and re-enlist) than by the makeup of the youth population (Segal & Verdugo, 1994). Those policies are driven by dollars, which Congress controls. Congress could, then, overcome any imbalance or shortage in the supply of qualified personnel by funding targeted incentives to enlist and reenlist. Just how adequately Congress will fund military recruiting is unpredictable in the extreme.

Public Support for the Army

To keep those budgets flowing from Congress, it is essential for the Army to maintain the legitimacy of the institution and the mission in the hearts and minds of the public. One source of public support is the Army's roots in veterans, civilian employees, and their families. In the YATS (Lehnus & Lancaster, 1997), service-age youth report veterans as being their main source of their perceptions of the military. Understandably, Army managers are worried over the decline in the numbers of veterans, especially in the ranks of the House and Senate on Capitol Hill.

The shape of the Army's personal connections with the populace is changing, too, owing to downsizing and 700 domestic base closures (Vollrath, 1997). Civilian links and support will be provided increasingly by citizen soldiers (Army Reservists and National Guard), Army civilian

career employees (e.g., Army Research Institute [ARI] researchers), and contractors. In the Army of the future, a heavy reliance on contractors is anticipated, but the size of the Reserve Component is a more political issue. Although its ties will be fewer in the neighborhoods, the Army is likely to be in the news often, as conflicts surface worldwide, humanitarian relief missions recur, and homeland defense becomes more visible. That publicity may help or hurt, depending on the Recruiting Command's skill in marketing the Army's future activities to young people.

The Media

The media will be a macro condition affecting the work of soldiers. Already they seem to be everywhere, and their coverage of the world will surely increase. Other countries and interest groups will use the media to seek international support, so foreign interpretations of the news will reach U.S. audiences increasingly. The media's willingness and ability to show the human costs of war may have contributed to the current American reluctance to risk casualties, and the after-action coverage of the environmental impact of NATO's air campaign in the Balkans could further discourage the world community from using destructive means. Military operations and the instigations for them will be more public than before, and the public's opinions on them, as currently and expertly polled, will be daily news. Soldiers at all levels will thus operate under the watch of the media and under commanders who are keenly aware of that scrutiny.

Technology

Another macro condition is technology. According to the Tofflers (1993), the impact of information technologies alone is sufficient to be creating a new era of human history. This era, they say, stratifies the existing nations into the agricultural, the industrial, and the information-based. The advanced economies are not expected to threaten each other militarily in the near term, partly because they are so economically interdependent. A concern for the economic impact of war appears in military writings: "...[G]iven the world political situation, it may not be possible or permissible to destroy an opponent's electronic deadly zone completely. Such a comprehensive strike might, for example, affect the world's economy in an undesirable way" (Buckley & Echevarria, 1998, p. 4).

At home, seeing our lives rapidly immersed in and dependent on information technologies, we imagine that all technologies will expand rapidly. That impression may be exaggerated because information technologies are more prevalent; many other sectors of technology are not moving as fast (McRae, 1994). But the pace of change also makes the future hard to see, because now any given future date is separated from us by a growing number of "technology event horizons" (Brand, 1997).

The invisibility of the future does not stop futurists from predicting it. A panel of futurists, under the sponsorship of the George Washington University Forecast of Emerging Technologies, recently made predictions of the most likely technological advances from 2001 to 2030 (Halal, Kull, & Leffman, 1997). Using environmental scanning and trend analysis, the project identified 85 emerging technologies for evaluation. In Delphi surveys, "about 45" (p. 28) "...prominent futurists, forecasters, and technical experts..." (p. 21) estimated the probability and date of each

technological development entering the main stream. Results of the survey are excerpted in Table A-3. They show that most of the technologies that are judged most likely to pay off are in information (hardware and software), materials, and energy.

In a 1998 survey of business and industry leaders, RAND took more of a needs assessment approach to future technologies (Popper et al., 1998). This survey is of interest because it reflects areas of likely research and development (R&D) investment by private industry. In identifying technologies that are currently critical in business/industry outside their own area of specialization, the panelists picked these five areas most often: software, microelectronics and telecommunications, materials, manufacturing technologies, and sensor and imaging technologies. The criticality of software comes from the growing demand for it, the need for more powerful programming tools (including natural language capabilities), and the shortage of software engineers.

Table A-3
Selected Technologies Predicted to Enter the Mainstream by 2030

Technology	Probability	Year
Distance learning	78	2006
Computer sensory recognition	73	2007
Personal digital assistants	75	2008
Intelligent agents	79	2009
Expert systems	72	2010
Buckeyballs and buckeytubes	69	2011
Machine learning	67	2012
Optical computers	64	2014
Superconducting materials	56	2015
Sophisticated robots	64	2016
Energy efficiency	61	2016
Material composites	53	2016
Biochips	54	2017
Synthetic body parts	58	2019
Hydrogen energy	50	2020
Intelligent materials	57	2026
Fusion power	50	2026

Note. Cutoff for including here: Judged Probability > .49. For a description of each of the 85 technologies, see Halal et al. (1997, pp. 27-28).

In identifying breakthroughs that would make the most difference in their own industries or firms, panelists identified a variety of software technologies (e.g., more efficient ways of

producing it, natural language recognition, software that learns), hardware, materials (e.g., lighter weight for energy efficiency), biotechnologies (e.g., culturing human tissue, genetic engineering of crops), and energy. Significantly, panelists had few ideas for possible new energy technologies.

The RAND panelists also spoke of technologies with the greatest public benefits, that is, criticality to the economy as a whole. "One striking feature of the interviews was the infrequency with which critical technologies for national defense were mentioned" (Popper et al., p. 66). Defense applications of semiconductors and biotechnologies were seen largely as side benefits of commercial work. Similarly, security of information and its infrastructure was a theme critical to the overall economy that is critical also to defense. High-payoff technologies of the future tended to be identified in more general terms. They included technologies in scale reduction, speeding up the product development cycle, and in industrial efficiency.

One striking similarity in these two views of future technology and in the military list of needed technologies (DCSDOC, 1998c) is that the technologies are tools, not improvements in the human tool user. That is, the lists include no technologies to improve the intellectual functioning of persons (e.g., their judgment, decision making, memory, or speed and accuracy of information processing) without giving them tools. Distance learning, for example, is *not* a technology for enabling people to learn things that humans are now incapable of learning.

The omission of technologies in education and training from these surveys may be an accident of sampling or a sign of pessimism about trying to improve the performance of the tool user. But several subject matter experts have expressed concern over the scant funding for R&D in the human technologies (viz., leadership, training, and quality personnel) by the military science and technology establishment (Brown, 1997; Ulmer, 1998; Weltman, 1997).

Technologies exist for improving human performance either beyond or more efficiently than typical practices. A RAND report notes "[T]he concepts of learning and instruction that [successful adopters of educational technologies] have used are not new. They have foundations in the work of Dewey, in the progressive school movement, and in the modern findings of cognitive scientists" (Glennan & Melmed, 1996, p. 94-95). Whether it is basic skills (Johnson & Layng, 1992), expertise (Ericsson & Charness, 1994), or work skills (Quinones & Ehrenstein, 1997), technologies for improving the performance of the human users of the hard technologies exist, and newer ones are likely to emerge for use in the future. They just await sponsors and users. In FY99, ARI has a small amount of funding to support basic research on accelerating learning and improving retention, and the cognitive sciences surely have great potential for improving human performance. In this domain, the urban legends surrounding new-age (and old mystical) panaceas for improving human performance will persist, even though these approaches have received scant support from two careful studies by the National Research Council (Druckman & Bjork, 1994).

Explorations are underway for cooperation between the entertainment industry and the military in the areas of modeling and simulation technology. In a special study for the National Academy of Sciences, a panel of experts from industry and the military found significant

research areas of common interest dealing with technologies for immersion, networked simulation, standards for interoperability, computer generated characters, and tools for creating simulated environments. Modeling of human performance is an active area of development whose great promise could emerge at a practical level in the future (Pew, 1997; Pew & Mavor, 1998).

Medical technologies seem to have brought the future into view most disturbingly, if not most rapidly, with cloning, gene transplants, body part transplants, neural prostheses, and cultivation of nerve cells (Service, 1999). Apparently safe drugs for prolonging people's capacity to work effectively between rests have been in hand for some years. We will not go into these physiological/medical technologies further, other than to note that they could force a reappraisal of values and practices regarding human life.

Although new technologies are an inspiration for the future Army, giving it unprecedented capabilities, those technologies are likely to have a problematic impact. Rather than making jobs easier, new technologies tend instead to make bosses and employees try to get more done. This effect comes about in two ways: simplifying some tasks while upskilling many jobs (Dede, 1995). A couple of familiar examples illustrate this point: as word processing has enabled many unskilled typists to produce good typed, formatted copy, secretarial positions have tended to be replaced by more complex jobs such as administrative assistant.[3] And as the former secretaries have been upskilled, many professionals who relied on them have added formerly secretarial activities to their own jobs. Similarly, truck driving used to be simpler job before it involved computers, radios, built in lifts, and other "labor savers." Whether the next generations of technologies will have the same effect on job complexity remains to be seen.

Enthusiasts for advanced instructional technologies (e.g., Marquardt & Kearsley, 1999) are optimistic about putting expertise into the hands of non-specialists in the field either in the form of hand-held procedural guides (e.g., how-to videos, step-by-step diagnostics) or via links with live experts. An unknown at this point is whether soldiers will be able to give up some of their other responsibilities when they add using such expertise-in-a-box to their existing tasks. In order for the benefits of new technologies to be realized in the future, enlisted jobs will need to be designed with total work load in mind, not just the individual tasks that new technologies may help with.

On reading the list of to-be-developed, leap-ahead technologies that the Army requires (DCSDOC, 1998c, 1999a), a lay person could be excused for skepticism. Some of them sound like science fiction, including structure-penetrating sensors for urban settings ("x-ray vision"), ultrareliability, and high-speed ships that can offload Army materiel ashore without the benefit of ports. Others sound like the *sine qua non* capabilities of the Army: low signature systems; breakthroughs in materials to reduce weight and improve protective power; very high speed, all terrain vehicles; unmanned, remotely-operated long-range precision fire and air defense systems; and improvements both in fuels and in the energy efficiency of engines. Others sound

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[3] Thanks go to Dr. Juan Sanchez for drawing our attention to the upskilling effect of new technologies.

contradictory: unmanned aerial vehicles (UAVs) with self-defensive or evasive capabilities to perform varied missions, but also, anti-UAV capabilities. And yet others have very uncertain horizons of practicality, like nanotechnologies.

The extreme optimism that a lay person might see in this wish list changes abruptly when one follows the media for a few months and goes to the web sites dealing with the Army of the future and the Defense Advanced Research Projects Agency (DARPA). Wearable computers, which are in use in delivery services and on factory floors now, are rapidly gaining in power and versatility (Rehm, 1999). Structure penetrating sensors? The Marsupial is a small, remotely controlled vehicle that can crawl in confined spaces (e.g., inside buildings) and launch a smaller vehicle on a tether for exploring still smaller spaces, all with the operator at a safe distance (Jacobson, 1999). A DARPA contract is supporting its development. With a similar objective, very small UAVs which can explore inside buildings could well result from basic research which has discovered how insects dart and hover (Dickenson, Lehmann, & Sane, 1999). That work is sponsored by DARPA and the Office of Naval Research. Now starting to appear in the literature is DARPA-sponsored R&D on technologies to counter bioterrorism (Alper, 1999). In 1999, DARPA also has projects underway on such Army-relevant technologies as situational awareness systems, tactical sensors, ultra-lightweight materials, and hybrid electric power systems with low signatures in the sound and thermal spectra.

In parallel with DARPA, the Army program is shaping future technologies through influencing the Army's investment in R&D. In FY98, for example, the Army's strategic research objectives supported Army After 2010[4] (AA2010)-sponsored projects on armor materials and multifunctional microminiature sensors (DCSDOC, 1999a). On the 1999 schedule for the Army is a technology seminar game on investing in R&D (DCSDOC, 1999c). Thus, many of the Army's technological needs are already beyond the wish-list stage.

The Other U.S. Services' Vision of the Long Range Future

Resources for this project permitted only a preliminary review of the other services' work on the long range future that might shed light on Army soldiers' work or qualifications. Here we summarize the small literature on the topic that was readily available in Air Force and Navy sources. The Air Force and Navy work has had two emphases: laying out broad assumptions and identifying specific issues.

In 1995, the Air Force convened "...130 preeminent individuals from research, academia, government, and industry...to search for the most advanced air and space ideas and project them into the future" (McCall, 1995, p. i). That project, New World Vistas, produced 2000 pages of monographs, including one volume on Human Systems and Biotechnology. One of the six essential capabilities that was identified (along with such things as Global Awareness and Global Mobility) was *People.*

The panel foresaw an increase in dependence on autonomous weapons and information systems for Air Force operations and computer-driven operations at high tempo. For flying

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[4] The term "Army After 2010" was originally known as the Army After Next or AAN.

combat missions, a mix of inhabited and uninhabited aircraft will be used. The broad assumptions about people in New World Vistas were that the Air Force would have an increased tempo of operations, a smaller personnel force, and, owing to a robust job market in the private sector, difficulty recruiting the best students in computer and information sciences. The lack of models of the performance of individual humans was seen as limiting simulations of engagements. Qualities such as "leadership, cohesion, experience, intelligence, and level of training" were identified as components that such models should include. The great success of simulators for lowering the life cycle costs (as opposed to initial capital costs) of transport aircraft and improving pilots' performance was noted, but simulators for high performance aircraft were seen as needing development.

Because training is a very large budget item, training efficiency was identified as needing improvement. New technologies in systems for selecting and classifying personnel were identified as essential for improving the match between people's aptitudes and the demands of their jobs. In the chapter where "leap ahead" technologies were recommended for development, several "human-related technology areas" were listed:

- Training, where selection and classification of persons were seen as improving training and reducing its costs.

- Human/machine interaction, including such specifics as automatic language translation and brain control of computers.

- Operational: "…a more detailed understanding of the human is needed."

- Biological, where known chemical means of improving and prolonging effective performance were recommended for further development and for research on identifying and limiting their side effects.

There appear to be no further Air Force documents on the long-range future of human resources. A committee of the Air Force Scientific Advisory Board published a study on the 21st Century Aerospace Force (U.S. Air Force, 1998) that did not deal with training, leadership, or quality personnel, but that contained these observations about the future operating context that are relevant to the Army:

- Military action may occur at any point on the spectrum of conflict and anywhere in the world,

- The U.S. military will withdraw further from forward bases into a CONUS-based but globally committed force,

- Reduced force size and personnel shortages will compound the Air Force's problems resulting from a continued high pace of operations, and

- "[A] growing fraction of AF resources will go to provide services to others rather than to the direct warfighting mission" (p. vii).

Although Borky et al. (1998) did not go into the manpower and personnel side of the Air Force's essential capabilities, they recommended that more attention be paid to human factors in developing space systems. "[H]uman factors remains a perennially neglected discipline, with

serious long-term consequences. Poorly designed operator stations and other aspects of the human/system interface impact everything from the effectiveness of system operation to training requirements to morale…As long as this problem is ignored, a host of unnecessary costs, many of them hidden, will continue to be paid" (p. 47).

The Navy is actively working toward the 21st century in the area of human resources. In 1998, it conducted a five-day technology initiatives game titled Manning and Training Operational Naval Forces for 2015+ (Director, Navy Test and Evaluation and Technology Requirements, 1998). Participants were members of the Navy's personnel, training, and research communities. This game followed two years of games in which "'people problems'…[did] not get the attention they need" (Game's Speaker Dr. Jim Andrews). The purpose of this game was "to focus on the most neglected component—the human being" in order to identify requirements in the time period 2015 and beyond and to recommend approaches to meeting the requirements. The recommendations were intended to be one input into the Navy's decisions on how to invest its budget for science and technology. One of the valuable features of this game was the inclusion of manpower/systems integration with manpower, personnel, and training.

Some major pieces of the context that the sponsors assumed for this game were as follows.

- The military threats to the U.S. will be unpredictable and diverse.

- Fewer forward bases will be available but the tempo of operations around the world will remain high.

- At best, budgets will stay level.

- Reliance on technologies will increase as manning levels decline and the U.S. works to maintain its advantages over potential adversaries.

- The U.S. will need to rely more on allies and partners in coalitions.

- The increasing demands on sailors and Marines could over-stress them and result in failure to realize the capabilities of advanced technologies.

- The Navy's spending does not reflect its rhetoric that "people are our first priority."[5]

The game produced one overall conclusion—that there are no technological solutions to most of the problems in the human resource domain—and identified the following more specific needs, which are selected from a longer set:

- Ways to increase the pool of potential recruits without sacrificing sailors' performance through using new predictors of successful service to select interested volunteers.

- For use in initial entry testing, a diagnostic profile to identify the types and amounts of training that individuals need.

- Programs of continuous on-the-job (i.e., onboard) training.

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[5] Every service exhibits this rhetoric (e.g., "Soldiers are our credentials"). The Army's adherence to MANPRINT procedures and its relative investment in science and technology (i.e., hard versus human) are indicators of the relation between rhetoric and practice.

- Ways to train sailors to have combat mores and culture rather than a technocratic one.
- Job design and an occupational classification system that produce more generalists.
- More flexible career paths, to include lateral transfer into/out of the reserves.
- Proficiency pay, not promotion, as the main reward; career paths permitting the proficient to remain at a stable rank, rather than having only an up-or-out choice.
- Ways to accommodate the expected cultural, experiential, and educational diversity (including gender integration).
- Models of human behavior and cognition.
- Measures of performance and measures of effectiveness.
- Cognitive aids (e.g., intelligent agents, reasoning systems, mission tailorable decision support tools, interactive technical manuals, round-the-clock reach-back technical support).
- Software and demonstration protocols for skill databases and knowledge inventories.
- Antidotes to physical and psychological stress.

In addition, panelists identified clusters of technologies that bridge the traditional separations of manpower, personnel, training, and human/systems integration. These included human-centric warfare models and interactive (between humans and machines) thinking, among others. After this technology initiatives game, Navy Personnel Research and Development Center (NPRDC)[6] developed a research program for the next decade (NPRDC, 1998). It amounts to a comprehensive research agenda in the areas of

- Selection and classification,
- Personnel planning and policy analysis,
- Distribution and assignment,
- Knowledge management systems, and
- Personnel surveys and program evaluation.

At the time of this writing (August, 1999), manpower and personnel research on the future Navy was undergoing the annual competition for funding. Funding decisions for fiscal year 2000 were expected by the end of September.

Implications for Quality Soldiers and Their Work in the Future

For this study, we have assumed that the systems described in Army writings will come into operation roughly on schedule. That assumption appears reasonable because the technological needs of the Army appear to be richly covered in the George Washington University predictions, the RAND survey of the private sector's future needs, and military investment in R&D. But

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[6] NPRDC will become the Navy Personnel Research, Studies, and Technology Department late in 1999.

"[e]ven if only a portion of these innovations are realized, their cumulative impact on change within the future Army will be profound" (DCSDOC, 1998c, p. 30).

Two other major implications can be found in reviewing the set of macro conditions for the future Army: recruiting is likely to be more difficult, while military operations are likely to become more frequent. Our reasons for those conclusions will be given next.

In the future, it is likely that soldiers will spend more time away from home on military operations than in previous eras because:

- The U.S. will continue to consider access to foreign energy resources for itself and its allies to be a vital national interest.

- Competition among the nations for the earth's resources will increase as the world's population increases, its demands for energy increase, and the environment degrades.

- Weapons of mass destruction, conventional arms, and advanced information technologies will proliferate as countries upgrade their military capabilities.

- The world community is increasingly accepting co-responsibility for stopping crimes against humanity even when a country commits crimes on its own residents.

- NATO has expanded its vital interests beyond defending the member nations.

- Nations, cultural and ethnic groups, and other parties will continue to press their claims for recognition, redress, and influence both militarily and in the media. Other countries will work to overcome the balance of world power that now favors the U.S. Those efforts are likely to bring them into conflict with the U.S.

- The U.S. is planning to rely for support and justification of military action relatively less on the large, slow acting alliances (the UN and NATO) and more on small, quick acting transient coalitions. Other nations can be expected to try similar means of influence.

- Terrorist attacks on CONUS are expected, which will give the Army more work to do to fulfill its mission of homeland defense.

It will probably be hard for the Army to find enough willing and able young persons to fill the enlisted ranks despite the expected 17% increase in the absolute numbers of the youth population by 2025, the large increase in the Hispanic subset of the youth population (Hispanics have a higher than average propensity to enlist), the growing preparation of young persons in the information technologies, and the likely increases in deployment. Recruiting will become more difficult because:

- Civilian jobs in the high technology sectors are likely to be plentiful and attractive.

- The financial return on investment in education will remain high, so the proportion of young persons continuing in school after high school is likely to hold or increase.

- Young persons will have fewer family role models with military experience as the number of veterans declines and as further closures of military bases lower the profile of the military in the neighborhoods.

- The preceding factors will combine to product a youth population with strong occupational values but weak values for the Army as an institution and way of life.

- Young persons' increasing control over their personal experience, via the Internet, will further reduce the already low level of civic commitment in youth and also reduce the numbers who want to experience the structured, selfless life of the military.

These conclusions are proposed as educated guesses; unforeseen events could change the whole picture. Although repeated terrorist attacks on CONUS are predicted to occur in the future, their likely impact on recruiting is unclear. Up to now, the Army's involvement in peace operations has been associated with a decline in young persons' propensity to enlist. The Army may find a way to market those activities to young people more successfully by 2025.

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Appendix C

Future Army Eras

The Soldier21/NCO21 study focuses on the knowledges, skills, and abilities (KSAs) that will be necessary for soldiers to perform successfully in the Army of the future. This future is defined by two eras. The first is the period from 2000 to 2010 and is commonly referred to as Army XXI (AXXI). The second period runs from 2010 through 2025 and is referred to as Army After 2010 (AA2010).[1] In concept and approach, these two eras are very different and as such they are treated separately from each other throughout this study. In actuality, there will be tremendous overlap between the two. Moreover, the AXXI era also has significant overlap with the Army of Excellence (AOE), the current era, up until AXXI begins. Additionally, the designation of temporal boundaries for the eras (such as 2000, 2010, and 2025) are artificial and are not meant to indicate milestones or threshold events. In other words, the future is a continuum. However, the designation of the eras as separate was a convenient way to compartmentalize the study and is consistent with the Army's approach to conducting activities regarding these periods.

Future predictions are uncertain at best and the farther into the future, the more uncertain the projection. This is certainly true for the description of AXXI and of AA2010. Changes in budgets, national priorities, technologies, research and development, and Army internal and external forces will all affect what we know now about the Army of the future. AA2010, being more remote, is particularly vulnerable to these shaping occurrences. Moreover, AA2010 also describes the process of futures work that involves a program of studies, wargames, specialty franchises, and seminars that is generating future concepts and ideas. The quick pace of discovery in the AA2010 program means major changes have evolved in a short period. Further revisions are a certainty.

Content and Organization of this Appendix

The descriptions of AXXI and AA2010 that are contained in this appendix are general in scope. They were used in the study to provide a background to typify the differences that can be contemplated in the future eras. The frame of reference for comparison is generally the Army of the 1990s (AOE) although some assumptions about AXXI are incorporated for comparison purposes into AA2010. The general descriptions are organized around the Army's functional components of doctrine, training, leader development, organizations, material, and the soldier (DTLOMS).[2] During the study, DTLOMS was used to derive the specific characteristics of each era that were deemed to have the greatest impact on soldier and NCO performance. These characteristics were then used to determine the performance components for soldiers and NCOs. These job components are contained in tables that follow each era's DTLOMS summary. Because of inherent differences between AXXI and AA2010, their treatment and organization will differ somewhat in this presentation. Each is explained within the segment for that era.

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[1] The term "Army After 2010" was originally Army After Next or AAN.
[2] DTLOMS is the Army acronym that identifies all major force modernization areas required for warfighting integration.

Army XXI DTLOMS

Army XXI is the period starting FY00 and running through approximately FY10. During the review of the AXXI DTLOMS, the following general characteristics of AXXI should be kept in mind.

- The foremost characteristic of AXXI is digitization, which includes information processing and automation. Ultimately, many current manual activities ranging from position location and reporting to status of fuel, maintenance, and ammunition supplies will be done either by digital command or by predetermined automatic protocols. Before the AXXI era is over, every soldier will be involved, in some way, with digitization. But soldiers will not be involved equally, commonly, or sometimes even knowingly.(Department of the Army [DA], 1994).

- Except for added emphasis on technology, AXXI will look very much like the current Army (AOE) as it has evolved from about 1983 through the 1990s. The organization of jobs into combat, combat support (CS), and combat service support (CSS) functions will continue (DA, 1994).

- Few new Army jobs will be created and few eliminated. The objectives of most military occupational specialties (MOS) will change little, but the number of tasks will increase and the scope and procedures for accomplishing individual tasks will likely change to accommodate digitization (Ford, Campbell, & Cobb, 1998).

- AXXI milestones are based on "spiral development:" a continuous, iterative process of testing new technology and modes of operation. This experimental approach means that continual change will earmark AXXI (DA, 1998).

- The era will consist of the simultaneous development of differing capabilities, structures, missions, skills, and requirements. A soldier's job may range from 21st century- high-tech to 20th century-low-tech depending on where he or she is assigned, all within the same MOS. Unreliability of early AXXI technology will require soldiers to maintain analog skills as back-up (Campbell, Ford, Cobb, & Shaler, 1998).

Army XXI Doctrine

Army XXI doctrine is largely an extension of AOE doctrine augmented by the potential envisioned by the increased use of digital information technologies. Early 21st century missions will become more diverse. Peacekeeping, humanitarian assistance, and stability and support operations will increase in number and frequency as worldwide instability continues to mark the first decade of the 21st century. Peacemaking and AOE-type land combat operations are a part of these missions. A peer competitor to U.S. interests will likely not exist during the period but the number and variety of threats will continue to increase.

Land combat in the early 21st century will not appear markedly different than that of the AOE – the tanks, howitzers, helicopters and rifles used to apply combat power will be the same or slightly improved (TRADOC, 1998). What will be significantly different will be how the Army plans, coordinates, and executes the employment of those systems. Superior situational awareness—a product of digitization—will yield more precise, effective, and efficient maneuver and fires as well as precision employment of dynamic obstacles and other combat multipliers.

The following factors are considered significant and likely AXXI doctrine for the employment of forces (DA, 1994):

- Distributed Operations – Digitization leads to increased *situational awareness*, which is defined as knowing where the enemy is, where all one's own forces are, and the status of neutral elements such as terrain, obstacles, and weather. With this increased awareness of what the battlefield "looks" like, systems and people can be positioned and assigned activities that will maximize the desired effects. Unlike AOE, which required positioning to account for contingencies and unknown likelihoods, AXXI can accomplish the same outcome with fewer resources. However, this will require empowerment of leaders and soldiers at a lower level than was characteristic of AOE.

- Non-linear Operations – The doctrine that proved effective during the Desert Storm Campaign in Southwest Asia organized battlefields into a linear fashion in which the enemy was defeated in battles fought in close and deep encounters and in encounters fought in the rear. These "locations" were relative to the friendly force being employed as well as to the deployment characteristics of the enemy. This doctrine was effective for massed friendly forces and an enemy that employed a traditional, predicted doctrine for engagement. The AXXI doctrine, based primarily on the assumption of superior battlefield knowledge, employs a concept of non-linear engagements. Instead of mass "lines," AXXI will involve many simultaneous and independent, yet coordinated, battles. Operations and units will not necessarily be contiguous, as was the case in Desert Storm. Digitization allows unprecedented dispersion between units, systems, and soldiers.

- Integrated Operations – Future operations will not be Army or even U.S. only forces. The Army, Air Force, Navy, Marine Corps, and the Space Command will in all likelihood be employed as a unified force, down to very low levels. Reserve and National Guard elements will make up a large proportion of the forces in all services. Coalitions and treaty agreements, such as North Atlantic Treaty Organization (NATO) and the United Nations (UN), mean that most future operations will have increasing multi-national flavor. Finally, national interests are not served solely by the uniformed services. Governmental organizations (such as the State Department, Department of Justice, Commerce Department, and the Central Intelligence Agency) and non-governmental organizations (such as the Red Cross, humanitarian, religious, and business groups) will be committed jointly with the Army to achieve national goals in military and quasi-military operations.

- Force Projection – During much of the AOE era, over 50% of Army forces were stationed in foreign (overseas) locations. Response to AOE threats was based on anticipating those threats and stationing forces in those geographical areas where the threats were deemed most likely or most potent. During the AXXI era, almost 90% of the force will be based in the continental United States (CONUS) and will respond to specific mission assignments by sending the appropriate sized and equipped force when and where it is needed. Force missions will be forced entry, early entry, or deployment forces depending on the mission and threat.

- The "logistical tail" has heretofore been an overwhelming obstacle to rapid, frequent, and geographically extended deployments. The ability to operate successfully from CONUS locations is dependent on AXXI advancements in logistics and support for deployed

forces. Anticipated advancements in force sustainment include increased automation for identifying items of supply; phased, multi-location of logistics and support forces within and outside the theater of deployment; and pinpoint distribution to ensure that the right number of items get to the right place. The personnel impact is that support forces (those commonly referred to as combat service support (CSS) soldiers) may likely face greater changes and challenges in their jobs, especially in the fields of digitization and information-based operations, than will combat and combat support (CS) soldiers. The full impact of the logistical revolution will not be known until more experimentation is conducted and more actual logistical automation programs are in place.

Army XXI Training

Army soldier development follows a model in which training is categorized as either *institutional* or *unit*. (There is a third component called *self-development* that currently plays a minor role but which will likely increase dramatically in scope in the future.) It is anticipated that Army XXI training will continue to follow the current model: Individual MOS-related training will remain institutional; collective skills and individual skill sustainment, as well as new equipment and mission-specific training, will remain a unit responsibility. While the training model will not drastically change over the next 10 years, the way that training is delivered (e.g., simulations, distributed learning) will continue to evolve as technology increases the ability to acquire and transmit information (TRADOC, 1999).

Army XXI institutional training will consist of much the same content as AOE institutional training but the means of delivery will change. Training will be:

- delivered where and when it is needed through a network of access centers and multimedia classrooms located at troop concentrations both in CONUS and in deployed locations, and

- extended by distance learning applications coupled with hands-on and practice iterations at soldier locations, conducted by unit supervisory and training personnel.

Unit training will likely increase its role in the training spectrum. The preferred method of collective training in units is called "live training" in which soldiers operate the actual equipment they will fight with, maneuvering on the ground and in the air and using real munitions. However, opportunities for live training during the Army XXI period will likely decrease due to budget constraints, deployments, and environmental considerations. All training will rely more on training aids, devices, simulators and simulations (TADDS). High fidelity simulators and virtual environments will become increasingly widespread as the means of conducting training on simulated fighting platforms, CS entities, and CSS functions. High fidelity dismounted virtual capability will become workable.

Army XXI Leader Development

Enlisted leader development in the early 21st century will continue to rely on the formal NCO education system (NCOES). This consists of the primary leader development course (PLDC) at the junior level; the basic and advanced NCO courses (BNCOC and ANCOC) at mid-career; and the sergeant major course (SMC) at the highest level. While BNCOC and ANCOC will continue to be MOS-specific, common core instruction will increase in most NCOES

courses. This increase in common content reflects the recognition that much of the leadership component of being an NCO transcends the specific job. Additionally, much of this standardized instruction will be shared with comparable officer and warrant officer courses; again a recognition of the migration of many traditional officer responsibilities to NCO level (DA, 1997).

Interactive multimedia will play a large role in the delivery of common core instruction leading to a reduction of on-site attendance at NCOES courses. In addition, the development of improved distributed learning courses will likely be used to ensure the standardization of Active Army and Reserve Component NCOES instruction (TRADOC, 1998).

Army XXI Organization

Organizationally, AXXI will look very similar to AOE. Army doctrine, employment, and command and control will continue to be centered on the basic organizational structure of the Army division.[3] There will be 20 divisions in the force composition (10 of these will be Active Army and 10 will belong to the National Guard). The division structures will continue to be either *heavy* (mechanized and armor) or *light* (including airborne and air assault) forces. Although the possibility exists of eliminating an additional Active Army division towards the end of the AXXI era, the current active component composition of six heavy divisions and four light divisions will remain viable through most of the period.

The organization of light divisions, already operating lean, will change very little during AXXI. Army XXI heavy divisions will be very similar in physical organization to current heavy divisions in that they will maintain three maneuver brigades, division artillery, a division support command, an aviation brigade, and several separate battalions comprising the division base. However, within those units, some significant changes will occur. Although the final structure will be subject to refinements, the following highlight several areas where the new organization (called Division XXI) will differ from the current heavy division:

- Overall, strength will be reduced by about 12%. Maneuver platforms (tanks and infantry fighting vehicles) will be reduced by 25%. Maneuver battalions will consist of three maneuver companies (*vice* four) and a total of 45 fighting systems as compared with 59 in AOE battalions.

- Maneuver battalions will lose their organic CSS resources. Maintenance, transportation, and medical support will come from a Forward Support Company (FSC) out of the division support command (DISCOM).

- Brigades will pick up an organic ground reconnaissance and surveillance capability through the formation of a new Brigade Reconnaissance Troop (BRT). The size of the maneuver battalion scout platoons will be reduced to provide the assets for the BRT.

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[3] An Army division is defined as a major administrative and tactical unit, which is comprised of the necessary arms and services required for sustained combat. It is the yardstick by which Army combat strength is measured and compared with other historical periods. Army divisions come in different types and vary in personnel from about 9,000 to about 15,000 soldiers with significant differences in equipment.

- Reserve Component (RC) positions will be designated as organic in each active division. These will be in command and control (C2), staff, signal, aviation, and medical positions. Around 500 positions will be designated as RC in each division.

The eventual impact of these changes on soldier requirements is only speculative at this point. Reduced numbers of fighting platforms mean that crews will occupy the same (or even increased) physical space with fewer platforms, increasing the isolation of individual crews and small units. New missions will accompany the creation of the BRT, perhaps requiring new skills of soldiers in these units. The removal of organic CSS will change the relationships of the soldiers with the supported unit; they will no longer "belong to" the unit they support. Perhaps the biggest unknown will be the RC/Active integration of individual soldier slots. Heretofore, effective peacetime integration schemes for RC and Active soldiers/units have met with frustration and eventual abandonment. The differences in requirements, culture, availability, and training opportunities that inherently exist have not been overcome. This new effort will require personal adjustments and redefinition of roles, and will be closely scrutinized in its eventual implementation (Hartzog, 1998).

In addition to these changes with the heavy division, experimentation with various command and control headquarters will continue throughout the period. A major impetus for this experimentation is the notion that the division organization (both light and heavy) may be outmoded as a means of deploying and employing forces for 21st century missions. The perceived problem is not with the units that make up these divisions, but with the headquarters element that controls and coordinates these units. One experiment being undertaken early in the AXXI period will be the Strike Force headquarters. Strike Force headquarters will be smaller than a division and will not have any organic fighting or supporting forces, instead accepting tailored forces matched to the threat and mission. While the Strike Force headquarters will be different and state of the art, the actual units it employs will be assigned as needed from available resources. The Strike Force will employ a series of C2 nodes to "plug in" to subordinate units and to reach back to supporting and national elements. Much has yet to be learned on how this headquarters will operate and be staffed (Turner, 1999).

Army XXI Material

No revolutionary technological material breakthroughs (for example, in propulsion, munitions, or protection) are foreseen for the first 10 years of the next century. This means that, with a few exceptions, the equipment of AXXI will be upgraded with evolutionary versions of current equipment in the fields of automotive, weapons, fuels, and armor, and that no major totally new weapons systems are scheduled to be acquired. However, all major systems will be outfitted with digital capabilities during this period. A few of these systems will be built-in digital but most will be legacy systems (existing systems) that will be retrofitted with digital communication capabilities (TRADOC, 1998).

The following highlight some of the major material issues for AXXI:
- The Army's First Digital Division (at Fort Hood, Texas) will complete digitization for two brigades by the end of fiscal year FY05. A timetable for operational digitization of the remainder of the Army is not forecast although continuous digital experimentation

will be a characteristic of AXXI (LTC Gerhardt, personal communication, February 10, 1999).

- Many aspects of digital equipment will significantly improve during the AXXI period including ruggedization, miniaturization, and user-friendly features such as voice recognition/response. Keyboards and touchpads may be largely eliminated on tactical platform applications. Increasingly sophisticated software updates and improvements to existing capabilities should be a constant feature of all digital applications during the AXXI period. However, true artificial intelligence (AI) applications to tactical military computers will probably not occur during this era.

- Digital capability for dismounted soldiers (dubbed *Land Warrior*) will be fielded during the period but operational applications will depend on the development of miniaturized, lightweight, low power enhancements. For most of the AXXI era, the dismounted digital capability will not match that available on fighting platforms (TRADOC, 1998).

- Passive lightweight automated battlefield identification systems should be perfected and integrated on all tactical and support systems including dismounts. The likelihood of fratricide should be significantly reduced.

- Smart tactical rockets will likely become operational during the period allowing "fire and forget" destruction of enemy artillery, air defense, and maneuver systems without the need for observed fire or to-target guidance. Overall, indirect fire delivery, accuracy, and lethality will increase significantly (TRADOC, 1998).

- There will likely be significant development in robotics and unmanned aerial and ground vehicles (UAV and UGV). These will generally be applied to high-risk tasks such as mine clearing and surveillance of highly protected resources. However, general tactical reconnaissance and surveillance will remain a human activity, although augmented significantly by sensors (TRADOC, 1998).

Army XXI Soldiers

Soldiers will continue to be the mainstay of the AXXI operations. No systems or operations will exist without soldiers. The "human dimension" of performance will be tantamount to any changes in organization, leadership, training, or doctrine. Indeed it is this soldier dimension that often drives changes in the other functions. Some issues that have been raised about early 21st century soldiers include:

- The military services in the late 1990s are having problems meeting recruiting goals for new service members. Failure to meet goals could result in lowering standards for enlistment.

- Retention rates for soldiers after their first enlistment are about 33%. These rates have been fairly stable in the past and are unlikely to change dramatically early in the AXXI period.

- Many factors are affecting the current youth population including a strong economy, increasing educational opportunities beyond high school, and a declining propensity to enlist for military service. All these affect the quality and motivation of potential new soldiers.

- Physical fitness, endurance, and agility will continue to be important aspects of performance of all soldiers. Pure strength tasks will be reduced somewhat but ability to withstand physical, mental, and emotional fatigue will become increasingly important.

- Lack of discipline and respect for authority in some segments of the recruitment population compound job satisfaction, attrition, and retention issues.

Army XXI Characteristics and Job Components
for First Tour Soldiers and Noncommissioned Officers

Based on the study of the literature surrounding the AXXI DTLOMS summarized above, coupled with the extensive field interviews described in the Methodology section of this report, there were six characteristics that were identified as having the greatest potential for impact on the job performance of soldiers and NCOs in the first 10 years of the AXXI era. The characteristics identified were:

- Transition to Digital Operation and an Increase in Technologies

- Diverse Missions and Frequent Deployments

- Diversity of Forces

- Decentralized Operations

- Training

- Youth Population Changes and Recruitment

These characteristics (which are expanded on in Tables C-1 through C-6) were used to analyze the expected impact that they would have on the performance of enlisted soldiers in the AXXI era. This analysis included a review of existing job components primarily from the AOE and an identification of changes that would be generated by the AXXI characteristics. In some cases, new performance components were identified but the most general result was a more specific AXXI definition appended to an existing AOE performance component.

In Tables C-1 through C-6, the six individual characteristics are explained, followed by the inferred job demands for both first tour soldiers and NCOs generated by that characteristic. Because different characteristics affect job components in different ways, many of the job components are repeated under different characteristics. Readers should keep the following in mind during the review of both the characteristics and the job components:

- This analysis focused on how soldier behaviors will have to change as a result of digitization and other AXXI characteristics. Therefore, characteristics and job components are meant to be Army-wide, not MOS-specific.

- The purpose of identifying Army-wide job components was to give expert panels (and analysts) a frame of reference for identifying KSAs needed for soldier selection (first tour) and for soldier promotion (NCO). The job components listed in Tables C-1 through C-6 are based on interpretation of AXXI information available at the time, some of which was presumptive. As AXXI unfolds, these job components are subject to refinement and revision. Future changes could have an effect on the KSAs that were identified in this study.

- Many existing AOE job components are generic. For the AXXI job component, the name of the job component does not change but details are added to identify how that component will be applied or changed. Therefore the job component descriptions are more detailed than their counterparts in the original AOE list (see Tables 11 and 12).

Table C-1
Army XXI Job Components for First Tour Soldiers and NCOs Resulting from Digital Operations

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Army XXI (AXXI) Characteristic - Transition to Digital Operations and an Increase in Technologies. The hallmark of AXXI will be the phased introduction of information age operations based on digital connections and supporting software. This will eventually affect all combat, combat support, and combat service support operations and interactions. Command and control, operations, and planning, from battalion through corps, will depend on digital links through the Army Battle Command System (ABCS) and the Force XXI Battle Command Brigade and Below system (FBCB2) as the primary staff tools. A tactical Internet will link all levels of command. At the troop level, there will be some embedded "total" digital systems in the form of the M1A2SEP tank, the M2A3 Bradley fighting vehicle, and the M109A5 Paladin howitzer. However almost all systems will have some facet of appended or add-on digital link capability. Dismounted digital capability, in the form of Land Warrior, will evolve as miniaturization, power, and durability issues are addressed late in the period. Maintenance, supply, and medical functions will increasingly reflect information technology and automation. Many non-tactical digital applications will be direct adaptations of commercial hardware and software.

<u>Inferred Job Components – First Tour Soldiers</u>

MOS/Occupation-Specific Technical Task Performance. Skill level (SL)1 job-specific requirements will gradually increase in technological sophistication as digital interfaces are integrated into systems. The number of procedural tasks to be learned will increase over AOE levels. Very few tasks will be eliminated. Much Advanced Individual Training (AIT) learning will be limited to basic, generic skills and in many MOS, specific skills will be learned on the job during the initial assignment. The rate of technological sophistication will be very uneven among MOS during the period.

Common Task Performance. There will be small changes in the number and scope of common tasks brought on by technological innovations. Widespread use of the precision lightweight global positioning system receiver (PLGR), the single channel ground and airborne radio system (SINCGARS), and possibly the vehicular enhanced position location receiver system (EPLRS) will generate advanced technological changes in some existing common tasks. Night vision enhancements may add some tasks. Although use of computers will become widespread among SL1 soldiers, it is debatable whether computer skills *per se* will become a common task requirement, at least until very late in the period.

Basic Computer Skills. The availability of commercial, non-job specific computers will become so wide spread in the Army that all SL1 soldiers will be expected to possess basic operational skills. These will include word processing, Internet use, e-mail, and familiarity with whatever changes evolve during the period. In garrison/home station operations at least, all soldiers will likely have access to computers and be expected to use them occasionally in routine communication, administrative, and training functions.

(table continues)

Table C-1 (continued)

Inferred Job Components - NCO

MOS/Occupation-Specific Technical Task Performance. Higher skill level technical proficiency will become increasing complex as the rate of technological advances accelerates during the period. Keeping abreast with the latest changes in one's job will become increasingly important and increasingly difficult. NCOs will be expected to be up-to-date but the number of variations possible in digital applications within many MOS will tax many of the more technical jobs. The cumulative nature of NCO tasks, coupled with added information era tasks, could double the existing baseline task domain in some MOS. A limited number of job assignments for staff NCOs, primarily at battalion and brigade, will require detailed knowledge and skills associated with ABCS/FBCB2 operation and maintenance.

Common Task Performance. NCO common task aggregates will be gradual and changes will incorporate technological advances learned at SL1 as described above. Computer operation will likely become a common task, probably at SL2 or SL3.

Basic Computer Skills. The availability of commercial, non-job specific computers will become so wide spread in the Army that all NCOs will be expected to possess computer operational skills. These will include word processing, Internet use, e-mail, and familiarity with whatever changes evolve during the period. In garrison/home station operations at least, all NCOs will likely have access to computers and be expected to use them frequently in administration, training, and other supervisory and communication functions.

Advanced Computer Skills. NCOs must become increasingly adept at installing and maintaining computer systems. This will include commercial-off-the-shelf applications and Army specific systems. They must possess a basic level of programming skill and must be able to troubleshoot hardware and software problems. This requirement will initially start at SL5 and SL4 but will migrate downward to more duty positions at lower skill levels by the end of the era.

Practical Problem Solving and Decision-Making Proficiency. The spread of digitization will increase the variations of applications. NCOs will increasingly be required to apply basic principles and goals to solve problems presented by digitization, including the use of back-up skills when digital applications fail or do not apply. NCOs will increasingly become information managers in the digital age. They will be relied on to become the human interface that applies controls to the flow of digital information. They must be able to sort, classify, combine, filter, and present information from digital sources so that it is usable by others.

Adaptability and Ingenuity. NCOs will be faced with an increasing variety of technical environments. Adaptability to rapid technical changes will be an increasing performance premium.

Writing. Computer communication, (e.g., e-mail), relies on written words and composition. Any computer communication is not only a permanent record but can be instantly retransmitted to thousands of recipients, inside and outside the Army chain. Increased NCO access to official or semi-official communications channels will increase requirements for NCOs to write in an organized, logical, coherent, responsible, and effective manner.

Table C-2
Army XXI Job Components for First Tour Soldiers and NCOs Resulting from Diverse Missions and Frequent Deployments

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Army XXI (AXXI) Characteristic: Diverse Missions and Frequent Deployments.

Diverse Missions: While no peer opponent is likely to emerge during the period, the number and complexity of Army operations will likely increase. Regional conflicts, peacekeeping, peacemaking, humanitarian missions, support to the United Nations (UN), North Atlantic Treaty Organization (NATO) and coalition forces, anti-terrorism, and domestic assistance are all likely to occur during the era. While some level of conflict will be inherent in all of these missions, much emphasis will be on logistics, support, labor, construction, assistance, and population control. For warfighting units, their versatility and deployability will result in assignments that are not always consistent with their warfighting roles. Each non-traditional mission will be somewhat unique and there will be little carry-over and lessons learned from preceding missions.

Deployments: Deployments will tend to be smaller size, for shorter periods of time (as compared with 20th century conflicts), but more frequent. The vast majority (up to 90%) of Army forces will be continental United States (CONUS) based but soldier time spent away from his or her CONUS location will increase as fewer troops respond to more missions. Participation by the Reserve Component (RC) in deployments will increase but will not alleviate the deployment requirements of Active Army soldiers.

<div align="center">Inferred Job Components – First Tour Soldiers</div>

MOS/Occupation-Job Specific Task Performance: The jobs of soldiers may be less MOS dependent and more determined by the mission, area, or duty assigned. Discrepancies between mission trained for and missions assigned may be most pronounced in warfighting units. As presaged by late AOE period deployments, conditions of soldier job performance will be more varied and may change even within a deployment as the situation matures. Performance generated by different missions creates not only new individual and collective tasks but also new relationships and patterns of behavior that must be adopted. New soldiers may have less time for on-the-job training (OJT) before being deployed.

Practical Problem Solving: Peacekeeping and unconventional missions generate many situations that are not "in the book." There is apt to be a disparity or time lag between doctrine and doctrinal tasks and field applications; soldiers will increasingly have to operate in the absence of doctrine specific to their situation.

Adaptability and Ingenuity: Non-traditional missions are earmarked by unforeseen conditions and situations that do not have a prescribed procedure. Even at skill level (SL)1, soldiers will have to apply non-standard solutions in new experiences.

Stability: Increased deployments, absence from home station, and unknown situations all increase the mental and emotional stress under which inexperienced soldiers must operate. The very factor of their inexperience can contribute to the uncertainties of the situation.

Effort and Initiative: Preparation for and conduct of deployments are intense periods of activity and learning. Long hours, non-traditional tasks, extra requirements, and additional performance are the norm. Soldiers have to work in an environment where many individual efforts go unrecognized and unrewarded.

(table continues)

Table C-2 (continued)

Adherence to Regulations and Orders: Deployments, particularly for non-traditional missions, are often earmarked by regulatory do's and don'ts. Standard operating procedures (SOP) and rules of engagement (ROE) are often imposed by decree without explanation for their necessity. Soldiers must understand and abide by regulations and directives that may, to them, seem unnecessary or burdensome. AOE-era regulations and orders were mostly of routine, administrative nature. Increased deployments will generate more requirements to standardize performance through decree than were experienced in the limited deployment Army of AOE.

Integrity and Self-Discipline: Unconventional missions can be frustrating and their locale oftentimes brings young soldiers into contact with people and cultures that are alien or even hostile. Soldiers must control their own anger and prejudices in their dealings with foreign nationals, other armies, and host nations. Soldiers must be able to operate humanely in situations that are not governed by ROE and the Rules of War. Limited deployments during AOE foreshadowed what will be a more widespread requirement during AXXI.

Dependability and Autonomy: During deployments, many combat support and combat service support soldiers will operate away from their units and from direct supervisory control. All soldiers will need to operate without direct supervision on occasion.

Military Presence: Each soldier on a deployment represents the United States and the Army. Appearance and conduct are always being evaluated and increased media coverage of deployments highlights soldier appearance and deportment.

<p align="center">Inferred Job Components - NCOs</p>

MOS/Occupation-Specific Job Task Performance: The diversity of potential assignments increases the tasks that an NCO must be skilled on. Since many deployments are small unit operations, the increase in collective performance impacts most heavily on SL3 and SL4. Many of these are train-up tasks or one-of-a-kind that only apply to a specific deployment, but they still must be mastered.

Safety Practices: NCOs are directly responsible for the safety of operations. Deployments often involve live munitions, vehicle operation in new terrain and conditions, new health or climate threats, and fatigued and inexperienced soldiers operating under stress. Non-hostile injuries, casualties, and illness habitually extract a bigger toll during deployments than do hostile activities.

Practical Problem Solving: Each new deployment presents unique problems. While many of these are routine daily operational challenges, some situations could have a major impact. NCOs will be faced with an increased demand on their ability to apply knowledge and experience in new situations. Because of the decentralized nature of operations during many deployments, the greatest impact will probably be at SL3 and SL4.

Decision-Making: Unconventional missions increase the likelihood of decentralized missions and unanticipated situations. Routine decisions can take on new implications in sensitive environments. The ability to use common sense and reasoning in arriving at the correct course of action can be very important. As with other deployment work demands, this requirement may be most pronounced at SL3 and SL4.

Table C-2 (continued)

Adaptability and Ingenuity: NCOs who gained initial experience during the late years of the AOE may find the missions and deployments of AXXI very different. Nontraditional missions, urban orientations, new political realities, and ill-defined or rapidly changing threats can cause confusion and ambiguity. NCOs may be faced with more nonroutine decision opportunities during some missions for which they have no direct experience or preparation. Asymmetrical warfare means the opposition will not operate under any predictable parameters. NCOs will be expected to apply novel solutions to get the job done when standard solutions do not work. Yet solutions cannot create additional problems. Creative thinking is required to accurately determine when the situation is changing. The greatest impact will be at SL3 and SL4.

Stability: Deployments and non-doctrinal missions are, by their nature, unstable situations. NCOs participating will be subjected to stresses caused by family separations and internal stresses because of the leadership roles they occupy. Effective performance under these conditions can be difficult, but setting the example of performance and effectiveness for younger soldiers in these conditions is paramount.

Cultural Tolerance: Increased deployments mean increased exposure to differing ethnicities and cultures. Peace keeping and humanitarian missions will bring the Army into contact with different peoples. Moreover, while the AOE tended to be insular, the nature of future deployments (joint, coalition, host nation, NATO, UN, other government and non-government participation, civilian contractor supported functions) will expose Army members to new relationships. NCOs at all levels must modify their thinking and their behavior to adapt to these situations.

Oral Communications: Deployments and non-conventional missions are earmarked by uncertainty. Communication up and down the chain of command is essential to minimize the impact on operational requirements. NCOs are the vital cogs to accomplishing this. The ability to speak rationally and convincingly and keep others informed is a paramount requirement during deployments.

Effort and Initiative: Preparation for and recovery from deployments are times of increased activity. During the deployments themselves, activities can range from routine to unpredictable. Even more than normal, NCOs must take independent action in identifying and completing actions that must be accomplished to support the mission. These will tend to fall most heavily on SL3 and SL4 personnel.

Integrity and Self-Discipline: Deployments are often unstructured situations without the checks and balances that exist in home-station operations. Supervision is often uneven and some personnel may have opportunities for dishonest or unethical behavior, seemingly without risk of discovery. Accountability for activities is less clear in deployed and unconventional missions. NCOs need to exhibit high ethical and moral behavior both for the integrity of the Army and as an example for others.

Adherence to Regulations, Policies, and Procedures: Deployments are often one-of-a-kind missions guided by special SOP, ROE, directives, prohibitions, and guidelines. In addition to "normal" guides, NCOs are the backbone for knowing, interpreting, and enforcing these deployment-specific requirements within the Army.

Self-Development: The uniqueness of deployments and one-of-kind missions that will earmark AXXI means that understanding and learning will be a constant for NCOs. While NCOES and functional courses will continue to play a crucial role in general NCO competencies, and pre-deployment training of NCOs in situational exercises will be essential, neither of these will likely be totally sufficient in preparing NCOs adequately for their deployment requirements. The truly effective NCOs will be those that go beyond the mandated training. Moreover, increased deployments themselves may interfere with normal NCO educational system (NCOES) attendance as well as resident civilian instruction. It will be those NCOs who display initiative in self-development who are successful.

(table continues)

Table C-2 (continued)

Team Building and Teamwork: Deployments and unconventional missions have organizational implications. Existing branch-specific small unit groups such as sections, squads, and platoons may be operationally replaced by *ad hoc* groups composed of different specialties and with members from different services or organizations. Emphasis will be on rapidly assembling a mission specific team to accomplish and task and then reassembling a different team for a different task in a short period of time. NCOs will control many of these teams, both with and without officer supervision. But NCOs will have the responsibility for making these groups function effectively.

Relating to and Supporting Others: Future deployments will be complex affairs with most units maintaining a CONUS-based home station and perhaps an interim based logistical and administrative staging area as well. All these locations must be staffed and NCOs will play an exceedingly important role in providing manpower for this staffing. Unlike some AOE-era deployments, these positions will not be filled by non-deployable soldiers, but will require specially trained, motivated, and experienced personnel. This is particularly important in the case of home-station personnel who must interact with and support family members of deployed soldiers.

Motivating and Leading Others: Non-traditional deployments often involve soldiers performing missions that are not entirely consistent with what they perceive their Army jobs and roles to be. This is particularly true of assistance and humanitarian missions supported by warfighting units. Ambiguous and unpopular missions can affect soldier performance. NCOs throughout the chain need to exert positive leadership in such situations.

Training Others: As deployments become more widespread, more and more pre-deployment training packages and Combat Training Center support programs will be developed to prepare units for deployments. But the implementation of these training programs and the effectiveness of their application will be the responsibility of unit NCOs. The bulk of this training requirement will be at SL3 and SL4.

Directing, Monitoring, and Supervising Work: Non-traditional missions involve a lot of non-doctrinal performance and discovery learning. This in turn enhances the requirement for supervision, particularly at the SL3 and SL4 NCO level. NCOs will need to ensure that they and their subordinates understand deployment preparation requirements. In uncertain situations, it is critical that supervisors ensure assignments are clearly understood.

Planning, Organizing, and Coordinating: Many activities within non-traditional missions will be given to small units as objectives. It will be the responsibility of operational NCOs, primarily at SL3 and SL4, to come up with detailed plans to meet those objectives and to coordinate resources and personnel. Along with this will be the requirement to anticipate and avoid roadblocks to meeting assigned objectives.

Military Presence: Deployments heighten the physical visibility of the Army. Friendly and adverse media alike use images of soldiers to enhance their presentations. The physical appearance and bearing of soldiers is an NCO responsibility, accomplished both through supervision and example.

Table C-3
Army XXI Job Components for First Tour Soldiers and NCOs Resulting from Diverse Forces

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Army XXI (AXXI) Characteristic: Diversity of Forces. Experimentation, change, innovation, and inconsistency will mark the period of AXXI. Some units and soldiers will experience the very latest in technology and capability while others will operate little different from the Army of the early 1990s. Reliability of digital capability will be an issue throughout the period and the need for back-up to digital functions will remain. Many innovations and technologies will be one-of-a-kind or temporary. More and more units will fill unique niches in equipment, missions, training, and technology and there will be less standardization in the force. Technology will change rapidly. Developmental testing and experimentation will occur in operational units and must go hand in hand with training and mission preparedness.

Inferred Job Components – First Tour Soldiers

MOS/Occupation-Specific Job Requirements: Because of the diversity of units and equipment, more and more learning of SL1 tasks will take place in units rather than in advanced individual training (AIT). Some soldiers may have difficulty learning in this less structured environment. Overall, the number of tasks to be learned in many MOS will increase as back-up skills are added for digital or automated performance. In support of experimentation, skill level (SL)1 soldiers may have to learn tasks and perform activities that are related only to the experiment being supported.

Adaptability: Soldier experiences during their first tour will be less predictable and more subject to change as AXXI innovations are implemented and modified. New learning will be a constant.

Effort and Initiative: Change and inconsistency in equipment and procedures will be a characteristic of many units during AXXI. Constant change motivates some soldiers and inhibits others. Compared with their Army of Excellence (AOE) counterparts, AXXI SL1 soldiers will be required to perform more diverse tasks under changing conditions. Even routine tasks can be more challenging as innovations are tried out. Individual effort and persistence in performance, along with motivation to do the best job possible, will be increasingly important.

Self-Development: Even at SL1, the responsibility for learning and perfecting new or changed tasks will default to the individual soldier. Change and learning will be constant and not all changes will be accompanied by formal training or New Equipment Training Team (NETT) assistance. Even where such support is provided, task mastery will fall to the individual in many situations.

Inferred Job Components - NCOs

MOS/Occupation-Specific Job Requirements: The technical aspects of NCO jobs in AXXI will become more complex due to the diversity of units, assignments, equipment, and organizations. The AOE assumption of NCOs being technically and tactically proficient in their military occupational specialty (MOS) may be more difficult to maintain due to the uniqueness of individual units. NCOs coming from old assignments into the same job may be faced with totally unfamiliar equipment and operations. Likewise, there may be no or even negative transfer from the old ways of doing things. On the other hand, NCOs who have learned non-digital ways of doing things may be at an advantage when back-up skills are required. But NCOs who are away from their skill job for 2 or 3 years on generic assignments (recruiting, Reserve duty) may find themselves unfamiliar with what is going on in their MOS.

(table continues)

Table C-3 (continued)

Adaptability and Ingenuity: The number and nature of tasks will change during a soldier's career, sometimes very rapidly. Skills applied in an NCO's last assignment may not be sufficient or appropriate for the next assignment or mission. Old learning may interfere with new procedures and new training. NCOs will have to be continuously adapting to new ways of doing things.

Self-Development: Self-development will take on a new role caused by the diversity in units and equipment. The focus of self-development will shift from the long term, relatively structured AOE model to one of short-term, unstructured learning in order to acquire new skills engendered by new assignments. Learning paths for new skills will be less defined and NCOs will need to seek out learning resources from peers, contractors, civilian sources, and even subordinates.

Effort and Initiative: In AXXI, an NCO's experience, training, and skill for previous assignments are less likely to carry-over to the next assignment as more units transition to AXXI. Each assignment will be a new experience, yet NCOs will still fill their roles as leaders, teachers, and authority figures. Functioning in this environment will challenge NCOs and individual effort and initiative will never have been as important as it will be under these conditions.

Training Others: Under conditions of rapid change and experimentation, the role of the NCO as trainer takes on new meaning. NCOs must learn how to interact and utilize nonstandard resources such as contractors, peer experiences, and after action results. The requirements of NCOs to function as the primary unit training resource will not change but the conditions under which they develop and deliver training will. This effect will impact greatest on SL3 and SL4 who bear the brunt of unit training responsibilities.

Table C-4
Army XXI Job Components for First Tour Soldiers and NCOs Resulting from Decentralized Operations

Army XXI (AXXI) Characteristic – Decentralized Operations. Technological advances will increase the physical dispersion between units and elements, and between supporting and supported units. Elements can maintain friendly awareness without need for visual contact. Increased communications and digital situational feeds will allow remote commanders to monitor the status of widely dispersed elements. Employment of elements will be flatter and less hierarchical. Fewer troops should be employed in a unit or mission. More autonomous, smaller elements will be used, particularly in combat support and combat service support operations. Increased deployments and fewer available troops, coupled with increased technology, will drive operations to a lower level. Platoons and companies will become focal points for employment and operations.

Inferred Job Components – First Tour Soldiers

Teamwork: While it is not anticipated that the move towards decentralized operations will push significant decision making down to skill level (SL)1, the AXXI feature of decentralized and more independent small unit operations will highlight the requirement for teamwork among all members of small teams. Cohesiveness and trust will be major requirements of teams. Even junior members of teams will be involved in group dynamics and in implementing courses of action directed by small unit leaders. While most small unit activities will still mostly carry out prescriptive instruction, there will be an increase in situations that allow for group input and team participation in problem solving.

Dependability and Autonomy: Decentralized operations combined with smaller units and staffing will increase the requirements of many SL1 soldiers to perform their specialty independently. While still functioning as a member of a small team, there will be skills that some soldiers will bring to the team that they alone possess. This will be particularly true of combat support and combat service support soldiers that augment small combat teams.

Inferred Job Components - NCOs

Decision Making Proficiency: NCO and junior officer operational autonomy and responsibility will increase. Many officer judgments and determinations will migrate to the NCO level, depending on the situation. At the same time, the ability to accurately monitor low level unit situations will increase up the chain of command and decision making may become a more shared activity. Situational knowledge may become more widespread, but it may not be matched by incumbent experience to allow radically decentralized decision making to very low levels. The result may be a change in the AOE decision making model as it applies to NCOs. The greatest focus of altered decision making responsibilities will likely be at SL3 and SL4.

Effort and Initiative: An increase in the number of decentralized and independent operations will increase the probabilities that NCOs will directly control and command many of these operations. Responsibilities for many independent actions will be given to NCOs. Officer supervision will be either non-existent of increasingly remote. Greatest impact will be at SL3 and SL4 but there may be a migration downwards of responsibility throughout the NCO ranks.

(table continues)

Table C-4 (continued)

Planning, Organizing, and Coordinating: While this has always been an NCO requirement, the AXXI shift towards decentralization may bring about major changes in the levels at which this occurs. NCOs may replace many officers in liaison positions, staff positions, and even command positions. NCOs will likely become responsible for planning, organizing, and coordinating at a higher level and without officer supervision. Interactions with other commands, government and non-government agencies, and joint forces may become an NCO responsibility.

Oral Communication: As operations become decentralized and NCOs pick up more officer functions, one area of emphasis will be the ability to coordinate, convince, and inform others by speaking. NCOs will increasingly be called on to give informal and formal briefings. They must demonstrate an ability to organize thoughts and ideas and present them logically, accurately, and relevantly.

Relating to and Supporting Others: NCO-led small groups will become the building blocks that aggregate to form medium to large groups in decentralized operations. NCOs are key to team building and team operation and these, in turn, are key to effective decentralized units and operations. The ability to support the overall effort will be vital to successful AXXI decentralized and independent operations. NCOs must have an awareness of the larger picture and direct all efforts towards accomplishing end goals.

Table C-5
Army XXI Job Components for First Tour Soldiers and NCOs Resulting from Training

Army XXI (AXXI) Characteristic – Training. The reorganization and refocusing of the Army's training system based on AXXI initiatives started in the mid-1990s and will continue throughout the AXXI era. There are three components to this training revolution that will directly affect solder job performance.

<u>Increasing Reliance on Technology</u>. Training delivery of the future will take advantage of all current technological initiatives and some just being developed. Distributed training, distance learning, Internet training, computer-based instruction, and interactive media will be a few of technologies trainers and trainees will use. Virtual, constructive, and live simulation links will become truly integrated allowing unit and individual training to be conducted simultaneously at all levels. Virtual simulation will allow learning and practice of many hands-on tasks realistically and risk-free.

<u>Less Institutional Attendance</u>. Much of the institutional role will focus on the development of distributed training materials. More and more, the training location will shift to units as individual units become more unique in equipment, organization, and mission. Initial entry training (IET) will focus on soldierization and basic skill with specific SL1 task training shifted to units. Learning will become a constant activity rather than a singular event in order to keep up with changing technology and emerging, shifting doctrine.

<u>Self-Development Training Will Change and Increase in Importance</u>. Individually initiated training will become an increasing requirement in career learning. Self-development resources will increase and become more sophisticated technically, requiring new skills to access and use. The shift to self-development focussed training will start at higher NCO levels but it will rapidly migrate downwards eventually affecting all soldiers, even during their first tour. Complete integration of self-development, unit, and institutional training will occur at some point, likely during the AXXI era or shortly thereafter.

<u>Inferred Job Components – First Tour Soldiers</u>

Self-Development: The increase in unit training requirements will push job specific self-development requirements to lower levels, probably even down to the early years at skill level (SL)1 The individual soldier will become increasingly responsible for much of his or her individual task learning. At the same time, the availability of distributed learning and information assets will increase, including Internet-based tutorials and classes. Virtual performance opportunities may exist for some tasks/jobs to allow non-supervised practice of hands-on requirements.

<u>Inferred Job Components – NCOs</u>

Self-Development: The scope of NCO self-development requirements to keep up with job specific technical and digitization requirements will increase several-fold. Additionally, NCO will be expected to be increasingly proficient in general computer skills. Most of this will be through self-development although the opportunities for self-development through technology will also become more available. NCOs will be expected to be aware of and to push self-development opportunities for junior soldiers.

Training Others: As more and more skill learning is shifted to the unit, the role of the NCO as trainer becomes even more important than it already is. Moreover, the complexity of the technology increases the responsibility of NCO being the one to "know the answers." Training "packages" may be externally developed but implementation and tailoring application will fall on unit NCOs. Innovations in training technology will require NCOs to become knowledgeable about available technologies and to integrate them in their training plans. Impacts of new or changed training requirements will be greatest at SL3 and SL4.

Table C-6
Army XXI Job Components for First Tour Soldiers and NCOs Resulting from Characteristics of the Youth Population

Army XXI (AXXI) Characteristic – Youth Population and Recruiting. The new recruit requirements for all services (Army, Air Force, Marine Corps, and Navy) will remain right around 350,000 each year during the AXXI era (200,000 active and 150,000 reserve components). Of this number, the Army will require accessions around 90,000 per year to meet active duty requirements. Potentially, there are about 16 million men and woman that fall in the 17 to 21 year old age group from which the services draw. But the realities are far different. The services categorize the prime recruiting market as meeting the following criteria: (a) graduated from high school, (b) non-college bound within 12 months of high school, (c) is not and has not been in service, (d) is physically and morally fit, and (e) scores in the top half of mental ability (Army Forces Qualification Test ([AFQT] Category I-IIIA). Applying these criteria reduces the population cohort from which to draw to about 840,000 persons in the year 1999 (rising to about 940,000 in 2006). More importantly, the Youth Attitude Tracking Survey of high school seniors shows a steady decline of people who want to serve in the military to about 18% of male youth and about 7% of females. A strong economy, a rising minimum wage, increased post-high school choices, and a decreasing identification with the military affect recruitment. When the services cannot fill their goals from the existing prime recruiting market, the most likely course of action is to adjust the criteria.

<u>Inferred Job Components – First Tour Soldiers</u>

MOS/Occupation-Specific Job Requirements: Overall, it is anticipated that the technical difficulty of jobs will increase during AXXI and the demands in some specialties will be significant. A decline in the quality of incoming soldiers will probably not affect all jobs equally. High quality recruits will still probably be steered towards high demand jobs. But jobs with lesser demands will likely experience the acquisition of lower quality personnel. The alternative to not lowering standards would be to not fill vacancies at all and this would create its own set of problems.

Adaptability and Ingenuity: While lower capability soldiers can be trained effectively on procedural tasks, they are generally less effective in situations that do not have a prescribed solution or procedure.

Effort and Initiative: Young people traditionally do not have much of a record on which to base judgment of future performance (e.g., work history). One opportunity that all 18-21 year olds have had is to attend and graduate from high school. While high school education in itself does not predict ability, graduation does demonstrate perseverance and effort in completing a minimally regimented requirement. Lowering high school graduation requirements adds to the potential recruit population but focuses on people who have already quit the only thing that has been so far required from them in life.

Dependability and Autonomy: While lower ability individuals can adequately perform most existing SL1 requirements, it is anticipated that they will need more guidance and supervision.

Self-Development: For self-development to work as a facet of AXXI training, it will depend on individuals who are both motivated and capable of learning largely through use of non-instructor mediated material. If large numbers of lower quality soldiers are introduced, self-development may not be a viable learning pillar for SL1 or new concepts for self-development may have to be developed.

(table continues)

Table C-6 (continued)

Physical Fitness: The general health and physical fitness of the youth population has been declining through the 1990s and this trend will likely continue through AXXI. As the pool of likely recruits shrinks, the Army will be to be less able to discriminate on the basis of physical abilities and still meet manpower requirements. Physical fitness can be improved during Army service but this requires time and training and commitment to a program. Another option is to reevaluate which specialties need what kind of physical traits to support AXXI characteristics and to select, assign, and train accordingly.

<u>Inferred Job Components - NCOs</u>

MOS/Occupation-Job Specific Technical Requirements: As the number of lower quality recruits increases, many of these will eventually become the NCOs of the future. Through training, education, maturation, selection, assignment, and mentoring, most of the lower quality soldiers who are retained can become productive, quality NCOs. But, for most Army jobs, their development will have to be a more deliberate process and the disparity between very high quality NCOs and "average" NCOs may increase.

Cultural Tolerance: The U.S. Hispanic youth population will increase to 20-25% of the total youth population by 2010. Urban youth will predominate. Generation differences will be magnified as youth culture is increasingly media responsive. The AXXI Army will remain a traditional, conservative, male-dominated organization, but acceptance and accommodation of differences in U.S. youth culture will be an important aspect of NCO jobs.

Motivating and Leading Others: Many of the low quality recruits will reflect the lesser socioeconomic strata of the U.S. population. They will reflect youth that do not have the life and lifestyle choices available to other socioeconomic groups. Increasingly, NCOs will have to rebuild and motivate individuals making up for societal shortcomings. The NCO as role model will be a significant part of the job. This will affect junior NCOs (SL2/SL3) the most. Instilling Army values and ethics will be an increasing challenge.

Training Others: "Trainability" is directly related to AFQT scores. As the overall trainability of incoming soldiers declines, and as AXXI sees a shift of SLI training from institution to unit, the role of the NCO as trainer becomes more acute. Success in training may be harder to achieve and more time in reinforcement and one-on-one training may be required. NCOs may have to be more adaptable and proficient in understanding and applying different training strategies and training methods to match different ability groups. Greatest impact will be at SL2 through SL4. Because of greater need to spend more time in training situations, the training burden will increase at all NCO levels.

Army After 2010 DTLOMS

The AA2010 is the Army that is planned for the years from 2010 to 2025, succeeding AXXI. This presentation summarizes the picture of AA2010 that informs the Soldier21/NCO21 project to date. Because the term "AA2010" has at least three distinct meanings, it needs some explanation.

A common meaning of the expression "AA2010" is as a reference to the unique, "leap ahead" forces and capabilities for warfare that will lead the Army into combat in the 2010-2025 era. Writings on AA2010 often describe only those new forces and capabilities, making it seem as though they will be the entire Army after AXXI. In reality, the new components, called the Battle Forces, will make up only about one third of the Army of that era. The second meaning of "AA2010" is the total Army of the era, which will be a hybrid of forces and capabilities ranging from legacy AOE elements through AXXI to the newest Battle Forces.

These first two senses of "AA2010" will be the *products* of the third sense, the current, ongoing *process* for conducting studies to inform combat developments for the distant future. In this third sense, "[AA2010's] objective is to provide the Army's leadership the raw materiel for a vision of war, and thus of land-power's role, in the 30-year future..." (Deputy Chief of Staff for Doctrine [DCSDOC], 1997c, p. 8). This AA2010's product includes issues and "ideas" that are published in an annual report to the Chief of Staff of the Army (CSA), in contrast with Force XXI's product of "concepts" as published in TRADOC PAM 525-5, and the doctrine of the present Army (e.g., FM 100-5). Conceptually, this AA2010 helps to foretell the future by providing promising new options for building that future. The proponent for this program is the DCSDOC, U.S. Army Training and Doctrine and Command (TRADOC), with its Future Battle Directorate (FBD) taking the lead.

The AA2010 program includes seminars, conferences, studies, idea teams, and war games involving a host of cooperating commands and other players. In the first two years of activity, the AA2010 process concentrated on military art and technology (i.e., the Doctrine, Organization, and Materiel elements [DOM] of the DTLOMS framework). In 1999, the process is expanding to include the three human domains of DTLOMS: Training, Leader Development, and Soldiers [TLS]. Seminars of experts, coordinated by HQ TRADOC, are scheduled for each of the six domains during the year. Major issues that the six domains will address are illustrated in Figure C-1.[4] The questions for the Quality People (i.e., soldiers) seminar overlap the issues of this project.

In addition to the seminars, The Center for Strategic and International Studies has contracted to examine issues related to military culture and to report back by the end of September 1999. That study is important because the findings of the first two years of the AA2010 process could entail some fundamental changes in the way soldiers relate to each other, to their commanders, and to the Army.

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[4] These imperatives and issues were initially identified in early 1999. As each domain was addressed, many of the issues changed. The issues listed in Figure C-1 are intended to give some idea of the scope of the imperative rather than to identify specific issues which might or might not be addressed.

Training:

- With ever increasing advances in simulations, what mix of field and simulation training – individual and collective–will be routine after 2010?
- What level of Joint and Interagency training will we require to effectively carry out successful Interdependent operations?
- How advanced concepts and technologies facilitate improved integration of active component (AC) and reserve component (RC) elements?
- How can distributive simulations facilitate combined U.S. and Coalition training beyond 2010?
- What will national interdependence training look like in 2010-2025?

Quality People:

- Will technology make it easier to train the average soldier to perform more complex tasks; or will our Army beyond 2010 require fewer and more carefully selected "Best and Brightest" soldiers?
- What proficiencies in Information and other advanced technologies will be required of new recruits in 2025?
- How will the Army be able to recruit & develop soldiers & leaders who can meet the greater responsibilities associated with high technology and flatter combat organizations on the 2010-2025 battlefield?

Leader Development:

- What new leadership development regimen will be needed in order to produce commanders capable of leading our soldiers in "Interdependence Warfare"?
- What mix of generalists and specialists will we require in our leadership pool to win on future battlefields?
- What will be the optimum leader to led ratio/span of control for future Army combat units on a more widely dispersed battlefield with flatter organizations?

Force Mix:

- How can we effectively and efficiently conduct Joint dynamic teaming on the future battlefield?
- What mix of legacy and new advanced forces, and AC & RC, will the Army require to rapidly deploy and then conduct decisive operations across the full spectrum of future conflict, to include urban and complex terrain, and homeland defense?
- What kinds of Army forces are needed to conduct an effective Joint Strategic Preclusion operation beyond 2010? What is the need for Dismounts on this battlefield?
- What combination of forces and capabilities does the Army need to avoid stalemate on the more lethal battlefield of 2010-2025? Must view through nuclear, biological, and chemical (NBC) and urban lenses.
- What are the optimal organizational architectures of future Army units? How does the Army integrate complex tasks so that they can be "pushed down?"
- What is priority of tasks?

Doctrine:

- How can the Army ensure that doctrine development does not fall behind the ever-increasing pace of technology change?
- How will technology alter the way Army units vector future battle elements on the ground in the same way aircraft are vectored in the open skies? From where and how will we conduct this command and control?
- How will the advent of Information and other advanced technologies alter the way we currently fight across the full spectrum of conflict?
- What steps must we take to begin development of "Interdependence" doctrine for the 2010-2025 battlefield?

Modern Equipment:

- Where can smart systems provide payoffs to Strike Force Operations?
- How will the Army exploit unmanned systems & other advanced technologies beyond 2010 to reduce footprint and the human dimension burden, while increasing unit effectiveness?
- What is the proper mix of kinetic vs. precision kill on the battlefield in 2010-2025?
- What steps must the Army begin development of a Joint command, control, communication, computer, and intelligence (C4I) architecture for 2010-2025?
- How reliable and robust will C4I be?
- What new command, protection, mobility, lethality, & sustainment regimen will permit Army combat systems to fight and win on the battlefield after 2010, to include urban/complex terrain.
- What new technologies will allow future forces to be designed with reduced weight, smaller footprint, & reduced logistics?

Figure C-1. Six imperatives for the Army After 2010.

Source: Future Battle Directorate (February, 1999)

The emphasis of the AA2010 process is not on prescribing or elaborating what the future Army will be and do in detail; that will be the job of Army policy makers, combat developers, and training developers. Each of the pieces of this iterative, "spiral development" process has the potential to surface issues that could reshape the process itself, the emerging picture of the future Army, or the eventual product. The tentativeness of the emerging picture is acknowledged in AA2010 writings, which note that the unique new military capabilities of the Army in 2025 will require technological innovations that might or might not be achieved by then (DCSDOC, 1998c) and that the upcoming AA2010 studies of training, leader development, and soldiers' capabilities will help to evaluate the feasibility of the emerging ideas for the military (DCSDOC, 1997b).

However, it is unlikely that today's general enlistment standards of general aptitude, some level of academic achievement, and a clean record will become obsolete. Moreover, AA2010 as a whole will have a lot of overlap with AXXI. That overlap will come first from the inescapable coexistence of old, current, and incoming technologies at any point in the Army's history. Second, AXXI elements will be an integral subset of the total AA2010 that have their own specific roles. Given that the new era AA2010 Battle Forces is projected to comprise only one-third of the force, many soldiers who were selected by AXXI standards will enter the AA2010 era well qualified and prepared.

Assumptions About AA2010

The AA2010 process outlined above is intended to convey the inherent uncertainties that accompany any discussion of what AA2010 will look like. The AA2010 concept covers a wide variety of activities and programs, most of which will evolve over time. For purposes of this research, we assumed a description of AA2010 that was available in the early summer of 1999 and that is the material that is reflected in this appendix. In reality, the Army that exists in the years 2010-2025 may or may not bear any resemblance to what is described here. While we had little choice but to make assumptions about AA2010, the following should be kept in mind when reviewing these DTLOMS descriptions.

- What is presented are not facts. Most are ideas, concepts, or propositions meant to stimulate thought or to provide a basis to explore notions about the future. They are presented here as assumptions, which, if they occur, would have certain presumed impacts on soldier performance requirements.

- AA2010 efforts to date are very preliminary. Revision and innovation are an earmark of AA2010 studies and change in concepts may occur very rapidly. Information presented here reflects what was known as of the mid-1999 and is not necessarily current beyond that date.

- The DTLOMS descriptions represent a distillation of information available about AA2010. Because AA2010 work overlaps, this distillation sometimes involved interpretation by project staff. We do not present this DTLOMS as the position of the Future Battle Directorate or any other Army agency and we are solely responsible for the interpretations presented. In particular, terminology is often a sensitive issue. This description should not be cited as a source for names, phrases, and terms or used for reference beyond the confines of the research that it supported.

- Most AA2010 concepts have not been endorsed or approved by Army leadership. Certainly nothing in this presentation has. Some parts of AA2010 as it is currently known will undoubtedly be controversial and subject to far ranging debate. Nothing in the DTLOMS description should be construed as being on one side or the other in any emerging AA2010 debate.

The new capabilities that are projected for AA2010 between 2010 and 2025 could be fast or slow in coming, because of the unpredictability of funding. Given that uncertainty, we are asking, "What parts of the emerging vision of AA2010 seem to have implications for soldiers' work in that era, whenever it may finally come into being?" As in the description of AXXI above, the material bearing on that question is organized under the DTLOMS framework. However, because of the way in which AA2010 information is unfolding, we have combined the presentation of information pertaining to "doctrine" and "organization" and that of "leader development" and "soldiers," so that DTLOMS is presented in four sections instead of six. Moreover, because the focus of the study was on the Battle Force, that element of AA2010 is given more attention in the presentation. Information on the AXXI components of AA2010, which would largely duplicate information presented elsewhere in this appendix, is not repeated here.

AA2010 Doctrine and Organization

This section summarizes organization and doctrine for AA2010 relating to the conduct of future military operations. Because elements of AA2010 doctrine call for execution by specific components of the fighting force, we have combined the discussion of doctrine and organization.

Although AA2010 doctrine now is preliminary,[5] in broad outlines it appears to be stable: AA2010 "simply seeks to provide the Army of 2020 with the physical speed and agility to complement the mental agility inherited from Force XXI" (DCSDOC, 1997c, p. 1).[6] In short, AA2010 doctrine modernizes the *Blitzkrieg* by remedying its defects (especially logistics), vastly expands the battle space in three dimensions, synchronizes the services in tightly joint effort, and takes the application of information technologies to a new level. The complexity of information age warfare is emphasized, with AA2010 staff papers (e.g., Biever & Echevarria, 1998) finding that complexity all the way down to the individual soldier.

As in the past, the Army will have a variety of responsibilities: reassuring allies, deterring possible adversaries, precluding crises, responding actively to threats to the U.S. and allies, defending against attacks abroad and at home, and providing stability and support where needed (DCSDOC, 1998c). As instability and conflict arise, the Army will be called on often to carry out these responsibilities. Because enemies of the AA2010 era can be expected to have precision fires and weapons of mass destruction (WMD), survival will require our forces to act in dispersion and with great agility by means of *Knowledge* and *Speed* (DCSDOC, 1997c).

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[5] In mid-1999, revisions to FM 100-5 (published 1993) and FM 525-4 (published 1994) were in various stages of preparation and not available for this project. So the account of AA2010 doctrine comes mostly from the Annual Reports (DCSDOC, 1997c, 1998c).

[6] Delays in digitizing the existing force may push the complete attainment of the force's mental agility out into the era when AA2010 is undergoing combat development (GAO, 1998b).

"Knowledge" has an absolute and a relative side. Absolutely, it means knowing all that we need to know; relatively, it means having much better information than the enemy ("information dominance"). A wide range of capabilities is implied, including these: giving commanders a view of the location and condition of all of our human and material assets ("total asset visibility"); giving forces a common, complete, accurate, and current picture of the battle situation at the level they need to know it; knowing enemy locations, actions, forces, and intentions; synchronizing the many parts of our joint and coalition forces; and denying an enemy comparable knowledge. Knowledge will let us maintain advantages of position to initiate surprise, standoff engagements instead of predictable force-on-force ones (DCSDOC, 1997c).

The complement to Knowledge, "Speed," is required at the strategic, operational, and tactical levels. The AA2010 vision calls for Battle Forces in a high state of readiness to deploy themselves within days to anywhere in the world. Strategically, speed in deploying may preempt an enemy attack and otherwise limit enemy options for action. Operationally and tactically, speed is essential for survival; static or slow moving forces can no longer survive the punishment of an enemy's precision fire and WMD. Only by crossing "the deadly zone" at airborne speeds can an attacking force arrive at the points of engagement in condition to engage successfully. Between engagements, elements of the force will redeploy rapidly by air, and while on the ground, battle elements will move rapidly in high-speed vehicles. Such operational and tactical speed will have U.S. battle elements attack, move before the opponent can respond, then attack again. By staying inside the enemy's decision cycle, U.S. forces will frustrate enemy targeting and keep the enemy on the defensive. As a matter of tempo, speed involves maintaining a continuous pace of operations until each objective is achieved. Knowledge encourages speed by permitting forces, with awareness of friendly and hostile locations, to avoid overmatch, and make every move count (DCSDOC, 1997c).

Within the Army, "[t]he hybrid force of 2025 will be forged from a range of functions, force structures, and capabilities spanning 20-25 years, from modernized AOE organizations to AA2010 Battle Forces..." (DCSDOC, 1998c, p. 11). Although the Army is always a work in progress, the gap in capabilities between the least and most modern elements of AA2010 will be greater than today. This force will consist of a number of components, each with special strengths and roles. Looking at the roles in a sequence of operations, from preparation through decisive action to stability and support, the fighting force will consist of these components:

- Battle Forces
- Special Operations Forces (SOF)
- Forward deployed AXXI-era forces
- Campaign forces
- Homeland defense forces

Battle Forces

Operating as part of Joint Expeditionary Forces (JEF) and comprising about one-third of the AA2010-era fighting force, Battle Forces will be smaller than a current division and larger than a brigade. For agility, these early-entry forces will be designed to have a relatively light burden of present-day functions like supply, intelligence, and fire control. Many of these functions will be

distributed elsewhere, from outside the battle area (e.g., resupply) to space. All Battle Forces will have tactical lift and attack helicopters, reconnaissance/intelligence units, plentiful unmanned aerial vehicles, high speed vehicles, fire control platforms, and varied support units. All will be highly nimble, with mobility in the battle space coming from both tactical airlift and the highway speed of the combat vehicles.

Corps level command structures will manage Battle Forces. If Battle Forces are not able to terminate a war decisively, they will operate to blunt and contain enemy activity, shaping the battlespace for the success of decisive follow-on Campaign Force operations. A corps air and missile defense command will protect the forces and their supporting functions from air attack and long range rocket or missile strikes.

A Battle Force will have six Battle Units, each with six Battle Elements (see Figure C-2). All forces will be linked digitally to sensors, supporting artillery, air defenders, air attack assets, electronic warfare systems, and neighboring units (Eden, 1997). Within each Battle Unit there will be a reconnaissance, intelligence, surveillance, and target assessment (RISTA) element with UAVs, a command and information management element, and ground maneuver units. The Battle Elements will be smaller than today's company and will command six vehicle crews or rifle squads. The command structure will be more networked, less hierarchical than today, with the small teams having great independence of action. The combat branches will be integrated in the Battle Elements at lower levels than before; for example, the crewed weapons will perform multiple gunnery functions that reside today separately in air defense, field artillery, tank, and infantry systems. Sensor and target designating systems will change fires so that almost all fire is "direct" regardless of distance and terrain (Eden, 1997).

The Battle Force will conduct combat operations ranging from small-scale contingency actions up through major theater wars. They will deploy into the battlespace, in part directly and in part through intermediate staging bases, starting within as little as 48 hours after the command, arriving ready and supplied to fight for two to three days. During that initial period, the support pipeline will be established and support will start flowing. Operating in large numbers of small teams, the Battle Force will move into positions throughout the entire expanse of enemy military capability. Individual teams will fight in pulses of combat, after each of which they will move and lay low while hordes of other small teams take their turns. Seen as a force, the Battle Force will attack continuously from all directions to disrupt the enemy and destroy its will to win. This dispersed, swarming attack is designed both for survival (massed forces will not be survivable under enemy precision attack) and for giving the enemy targets that are too numerous and elusive to deal with.
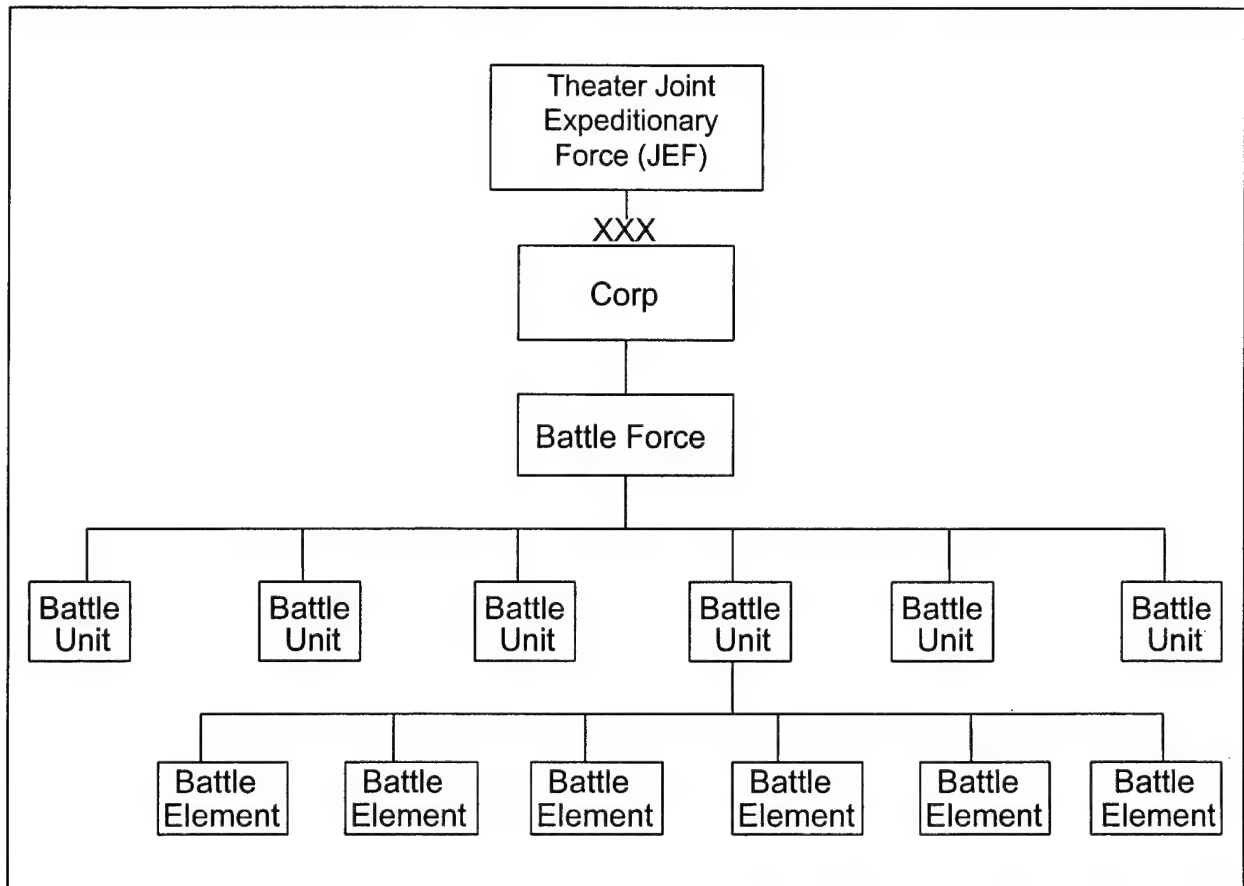
Figure C-2. Notional Battle Force structure.

To make tactical speed in the battle space practical, a variety of developments will shrink the logistical tail and lighten the Battle Force. Levels of fuel, ordnance, and other supplies will be tracked by automated on-board systems, which will be monitored at remote supply bases. Resupply will be "just in time" and "just enough." Fuels and ordnance will be of lighter, higher energy materials, and armor and automotive components will be lightened similarly. From sanctuary outside of theater there will be continuous aerial resupply, the materiel coming in part from pre-positioned stocks on the ground and afloat. In the combat zone, small, mobile logistics elements of the BF will receive supplies that are airlifted in and speed them by ground and tactical lift to end users. New "brilliant munitions," the successors of "smart bombs," will improve accuracy sufficiently to permit weapon systems to carry lighter loads of ordnance. Finally, two developments will enable soldiers to carry less firepower: unmanned static fire control systems will be seeded around the battle space and the dispersed ground elements will be able to mass remote fires from unmanned ground or airborne platforms, or even from space.

In the 1999 war games, several notional configurations of Battle Force are being used, each with unique systems and capabilities. Battle Forces come in a variety of forms and functions (DCSDOC, 1999d), some emphasizing agility and indirect fires, others having direct fire overmatch capabilities. Of special interest is a Battle Force that is designed for operations in complex terrains. Up through the 1998 report on AA2010, military operations on urban terrain

(MOUT) had been assigned to the Campaign Forces. Now, the likelihood that enemies will pull their forces into cities as an asymmetrical tactic has inspired exploration of a notional Battle Force that is specialized for urban warfare. Doctrine for MOUT by AA2010 is undergoing initial development in wargames in FY99, where it is the subject of a franchise under the joint lead of the Infantry Center and the Combined Arms Center (DCSDOC, 1999b). The early state of this doctrine is suggested by the list of approaches that are under consideration for use in MOUT (DCSDOC, 1998c, p. 19):

- Get there first to deny the enemy access

- Go around without engaging; bypass

- Surround without entering; lay siege

- Reduce by stand-off attack

- Seize by sending troops in

Each method has its own benefits and costs, and methods will be tailored to cases. At this point, "An entirely new paradigm for urban warfare needs to be explored to supersede the historical, manpower-intensive, time consuming operational framework that currently exists" (DCSDOC, 1998c, p. 19).

The complexity of urban warfare poses special dangers to friendly troops and the concentration of population is a strong incentive to minimize destruction. Non-lethal technologies (discussed below, under Materiel) are one category of tools that have important applications in this setting. Without them, MOUT will create very large numbers of casualties and prisoners of war, which the Battle Forces would have to deal with. New systems that will be required for AA2010 to conduct MOUT are given in broad terms: "unmanned platforms, large area nonlethal effects, brilliant maneuverable munitions, special urban assault platforms, structure-penetrating sensors, and revolutionary combat engineers" (DCSDOC, 1998b). In cities, enemies are expected to make use of asymmetric methods all the way from very old (e.g., booby trapping, snipers) up to WMD.

Special Operations Forces (SOF)

Special Operations Forces will have roles in all steps of the sequence of operations. Their most prominent missions in peacetime are counter-proliferation, foreign internal defense, special reconnaissance, and counterterrorism (General Accounting Office [GAO], 1997). Having SOF on the ground around the world as "global scouts" before conflicts begin gives the U.S. a resource for strategic assessment. In their forward locations, they are also a foundation for the force projection capability of AA2010 that links doctrine with diplomacy. Under the Joint Combined Exchange Training (JCET) program, SOF "...have established military ties in at least 110 countries...[for] helping foreign armies fight drug traffickers, teaching counter-insurgency..., and sharing U.S. military expertise in exchange for access to top foreign officials" (Priest, 1998a). In the AA2010 era, SOF will be involved relatively little in clandestine operations and more in multilateral peace operations, small contingency operations, and foreign internal defense (Buckley, 1997).

Forward Deployed Army XXI Forces

With forward deployed forces (e.g., in Europe and Korea), the U.S. will continue to make a concrete display of its commitment to worldwide engagement and defense of allies. The Army component of those forces, consisting of elements that are both forward stationed and forward deployed for training, will be largely of AXXI vintage. In the strategic application, they will provide sites and organization for staging and supply of the rapidly deploying AA2010 Battle Forces. The size of the forward deployed Army is expected to be at least equal to today's (DCSDOC, 1998c), which is about 155,000 soldiers at any one time (Reimer, 1999).

Once warfare is launched, forward deployed joint forces and strategic fires will carry out a synchronized theater-wide attack to create an information blackout by knocking out sensors, power nodes, space-based lasers, information satellites, and unmanned aerial vehicles (UAVs). This attack will prepare the battle area for entry by disrupting enemy patterns of operation, degrading enemy precision fires, and suppressing enemy air defenses. After operations by the Battle Forces, forward deployed elements may supply some of the force for operations that end battle and occupy territory to secure it.

Campaign Forces

Campaign Forces will follow Battle Forces into theater. If the Battle Forces have not forced termination, Campaign Forces will be equipped for longer conflicts. These forces will be designed to overcome extensive, hardened defenses. Consisting of AXXI legacy elements that have AA2010 information capabilities, Campaign Forces will otherwise be equipped with technologies that are evolved from today's. Because they are heavy, Campaign Forces will deploy slowly, require the largest part of the U.S. strategic lift, and need the largest of logistics structures. To counter those disadvantages, Campaign Forces may include units that are already forward deployed. The functions of occupying, controlling, and stabilizing land area are labor intensive, so they will require the greater numbers in the Campaign Forces. Campaign Forces will include Reserve Component units for long-term stability and support operations.

Homeland Defense Forces

Because terrorism within CONUS and cyberwar are expected to be two of future opponents' major approaches to asymmetric warfare (Lesser, Hoffman, Arquilla, Ronfeldt, & Zanini, 1999), the mission of defending the U.S. on home ground will be active and urgent. Traditionally, the Army has been a player in disaster relief. That work is likely to become more frequent and to have new forms because the Army is the Executive Agent (EA) for the Department of Defense Domestic Preparedness Program. The Army's work in Homeland Defense will also include three other major areas: (a) coordinating interagency bioterrorism defense systems; (b) developing and testing a national missile defense system; and (c) helping "…to protect and reduce the vulnerability of critical infrastructure including telecommunications, energy, banking and finance, transportation, water, and emergency service facilities" (Strategic Planning, Concepts & Doctrine Division, 1999, p. 12).

Perhaps even more so than today, the Army's role in homeland defense will rely largely on the Reserve Components. This work will involve providing domestic support to a host of federal,

state, and local agencies in law enforcement, public health, and emergency relief. Details of soldiers' requirements under the expanded work load in Homeland Defense remain to be developed. "At present, it seems clear that homeland defense operations will bear little resemblance to traditional military operations" (DCSDOC, 1998c, p. 8). In 1999, a specialty franchise on this topic is working to develop a vision of such operations.

AA2010 Materiel

Many physical systems have been conceptualized for AA2010—weapons, information, vehicular, and others. At this point, these systems are notional and mostly not in the open literature. In order for AA2010 to be able to execute its doctrine, numerous new technologies will have to be developed and refined to the point of affordability and usefulness. Many of the new systems will come out of the regular life-cycle development process. But also, in an effort to keep a competitive edge, AA2010 may rush prototypes to the field to have their human engineering soundness, their impact on the operators' total job, and their connectivity with other systems worked out in the field, while being operationally used. AA2010 soldiers will have a major role in adapting their work lives to such untried systems and in inventing the necessary training, techniques, and procedures.

In part, the capabilities of AA2010 will be advanced by civilian technologies that will arrive regardless of military needs. But also, AA2010 planners are working to speed up the development of other technologies that are unlikely to originate soon in the civilian sector. That process is reviewed briefly in Appendix A, under Technology. Here we select systems from the open AA2010 writings that give a sense of how the work of Battle Force soldiers may be different from preceding generations.

Combat Systems

Battle Forces will rely on a host of to-be-developed, fast, low-signature systems like the following:

- All-terrain, freeway-speed, long-range, armored combat vehicles that are 1/8 to 1/3 the weight of today's tanks. Their multi-spectrum target acquisition systems will control surface-to-air missiles (SAMs) and surface-to-surface missiles (SSMs) for use in non-line-of-site (NLOS) mode, as well as direct fire weapons.

- Tactical utility airlifters with speeds of several hundred knots, which will be the main means of maneuver on the battlefield for the early entry Battle Forces. They will be able to carry the armored combat vehicles between battle areas.

- Attack helicopters with capabilities akin to the traditional functions of armor and with reconnaissance and acquisition capability as well.

- Unmanned aerial vehicles (UAVs) ranging from model airplane size on up, having various capabilities (e.g., testing for nuclear, biological, and chemical hazards, communications relay; surveillance; psychological operations; delivering non-lethal weapons; and engaging targets with on-board ordnance). A tiny "robotic fly" UAV will be available for reconnoitering inside buildings (Dickenson, 1999).

- Fire support from very fast manned ground vehicles, attack helicopters, aircraft, platforms in space, and remotely controlled fire control systems that are both static (ground emplaced) and mobile.

- A family of small, very fast vehicles for command and control, scout and reconnaissance functions, repair, salvage, and supply.

- Individual and crew served weapons with capabilities for extreme accuracy in line-of-sight (LOS), NLOS, all-weather, and all-light conditions engagements.

- Target acquisition will come in part from multi-spectrum (i.e., sight, sound, smell, other radiation) arrays of ground sensors that are seeded in critical sites to detect enemy presence and movement and that select the right method of engagement to match the target. Ultra-smart munitions will carry capabilities for in-flight course adjustment. To minimize fratricide, all systems will have identification-friend-or-foe (IFF) capabilities built in.

Non-Lethal Technologies

In the AA2010 era, battlefields may host very large populations where enemies and non-combatants will be mixed together and visibility will be limited. To protect friendly forces and to reduce the likelihood of vast numbers of casualties and politically unsustainable prolonged wars, forces will need methods of influence that are between non-violence and lethal violence. Non-lethal technologies (NLT) (Morris, Morris, & Baines, 1995) offer such options. Under development now, NLT will enable U.S. forces to distract, disorganize, and deter opposition military and civilians with minimal injury to people and property. NLT may target persons or material, have offensive or defensive functions, and have local or wide area effects. They will require new systems, doctrine, training, and rules of engagement.

The exact technologies that will be developed for specific situations remain to be determined, but outlines of NLT engagement can be glimpsed through some of the tools that are under consideration: entangling, sticky, or anti-traction substances; obscurants; disorienting noises; dazzling lights; holographic phantoms; water cannons; sedating agents; stun weapons; voice morphing; engine killers,; filter cloggers; short-circuiting agents; computer viruses; soil destabilizers; chemicals that corrode physical systems; anti-missile systems; mine field neutralizers; and systems to detect and disrupt enemy electronics and fire control optics.

Information Systems

Information systems that make heavy use of commercial facilities will be central to information dominance in AA2010. These systems will comprise a "robust, redundant, reconstitutable" network of distributed elements. Individual soldiers will have total situational awareness from a personal command, control, communication, computer, and intelligence (C4I) suite, which will link them in a tactical internet. Day or night, they will know their own locations and the locations and identities of teammates, other friendly forces, enemy forces, and non-combatants. A tiny, personal, powerful bio-computer will be voice activated and, to avoid information overload, provide Battle Force soldiers automatic information management. Soldiers will be equipped with automated aids for diagnosing and repairing systems, performing first aid,

and making difficult tactical decisions on the spot. For communicating with host or coalition nationals, soldiers will carry two-way language translation devices small enough to fit in the ear.

Real-time biomedical monitoring of individual Battle Force members will be based on a combination of remote database information on personal characteristics and current indicators of their workload, hydration, sleep, nutritional status, and stress. That information will be used both to help sustain individuals and units and to help commanders in operational planning (Belenky, 1997).

Not only individuals, but also systems and supply stocks, will have embedded monitors for tracking amounts, working conditions, and locations. The tactical internet will link all critical components for automatically monitoring such conditions as individual vehicles' fuel supply and ammunition remaining and the location and physical condition of individual soldiers. This "total knowledge network" will receive and supply information to all organizational levels to give secure and reliable views of all human and material assets on the battlefield and elsewhere in the system.

Information systems are not without problems. "The proliferation of chattering black boxes on the knowledge-based battlefield will rapidly saturate the electromagnetic spectrum. If we add to this the competition from the enemy's digital traffic and his jamming efforts, the transmission of vital tactical information could be crowded off the air or lost in the clutter" (Eden, 1997, p. 3). On top of that, opponents will have hackers trying to foster chaos in the area of operations by attacking regional commercial and government systems as well as our C4I assets. Much of the Army's global information assets will rely on commercially owned and operated facilities, which may be available to adversaries as well.

Also recognized is the challenge of managing information. Several means of subduing the information load are envisioned: providing information at the user's option, providing information automatically pre-digested into a usable form, and providing users with automated job and decision aids. But at this point, "…exercising information dominance is a complex activity that is still understood at only a rudimentary level" (DCSDOC, 1998c, p. 16).

Soldier Support

At the individual soldier level, capabilities will be revolutionary as well (Future Battle Directorate, 1999). A soldier's very light clothing will have diverse capabilities: low signature; chameleon-like properties for camouflage; and protection against ballistic threats, chemical and biological agents, heat, and cold. Visors on helmets will permit night vision, display tactical information, and protect against laser light.

Soldiers' physical capabilities will be enhanced with light mechanical assist prostheses and back-pack rockets. Soldiers will prepare buildings for entry with remote robotic weapons systems. Other robotic systems will also carry personal gear, evacuate the wounded, and provide supplies. New power sources will eliminate dependence on batteries.

Complementing the biomedical monitors mentioned earlier, soldiers will carry light, highly nutritional rations and a variety of medical agents for first aid and protection against disease. When optimal biomedical conditions cannot be maintained, chemical agents that prolong

effective performance will be available. Nutrient patches and individual water purification kits will sustain soldiers (and lighten loads) when necessary. These, and all other capabilities, will be designed to permit the soldier to be extremely mobile and to endure for long periods of combat.

AA2010 Training

The vision of training for AA2010 is a work in very early progress. Some of the content of training is implied in broad outline by available details on systems and doctrine. The references to training delivery have few implications for selection or promotion, because the goal of training is to make as many as possible ready to perform, not to try to screen people. However, we may expect to see a significant change in the Army training dynamic in AA2010, particularly as it affects the Battle Force. Entry training for the Battle Force is expected to be in the form of apprenticeship, so large numbers of Battle Force NCOs will have responsibility for hands-on training and mentoring. These NCOs, themselves, will need to be trained as effective mentors to the apprentices, and their performance as trainers/ mentors will be a significant factor in their suitability as Battle Force NCOs.

By the AA2010 era, distance learning is expected to be in wide use (Halal, Kull, & Leffman, 1997). The "University After Next" will be part of the split basing structure, where units can access the knowledge resources of the schoolhouse without carrying them along (Meigs & Fitzgerald, 1998). To shorten the time to prepare for deployment, units will regularly train for world hot spots. This threat-oriented training will be conducted against opposing forces that are tailored to the capabilities and doctrine of likely opponents. Warfighter simulations are expected to represent all elements of the operational environment down to snipers in urban terrain and hostile crowds. The simulations will monitor and diagnose group process, use knowledge resources like those in the battlespace (e.g., biomedical and logistical monitoring), and practice units in integrating remotely available knowledge with battlefield awareness. Battle Force deployment will usually be too fast to permit train-up in live exercises, so deploying forces will rely on simulation-based training for most preparation. However, a distinct advantage of simulator training is that units that are geographically scattered will not need to be co-located to train together. Distributed interactive simulations will allow simultaneous interactions at all levels of widely dispersed individuals and forces.

However, while the technologies for distributed and simulated training will give training great new powers and flexibility, they do raise questions: How well skills can transfer from simulated settings to live ones; and will that transfer be variable among individuals? Johnson and Stewart (1999) raised these questions by observing that people may differ markedly in their ability to feel immersed (i.e., to experience "reality") in virtual settings. Indeed, the question of transfer from any simulations to the operational setting is persistent, but Johnson and Stewart's work focuses the question at a level that may be relevant for selecting and promoting soldiers.

Individual, computer-delivered training will be highly flexible as to time and place of delivery. Knowledge resources will be abundantly available 24 hours a day at anyone's computer in the forms of courses, special interest groups, interactive archives/libraries, extended faculty, and shared synthetic environments. Resources for self-development should be plentiful and effective. However, availability is not in itself the whole solution. Time to access, apply, and

develop a supporting motivational network, along with a means of evaluating effectiveness, are all required.

As noted above under Materiel, a variety of very small, portable information resources is expected to help Battle Force soldiers meet the informational and tactical challenges of the complex battlefield (e.g., hand-held aids for diagnosing and repairing systems, giving emergency medical care, and making tactical decisions). Training optimists (e.g., Marquardt & Kearsley, 1999) expect resources like these to put usable expertise in the hands of non-experts. The expectation is that non-experts will be raised to useful levels of performance outside their own specialties and that the complexity they can handle in their primary fields will be expanded as well. While these knowledge resources will require training in their mechanics and in the decision making involved in using them, they could give soldiers much more depth and breadth of capabilities without much more training. However, even with very effective information/knowledge tools, soldiers will need to be trained to manage information. Information management skills will include being able to turn data into knowledge, to selectively ignore information, to multi-task, to disambiguate and deconflict poor information, and to recognize and recover from corrupted information. These skills will be needed in a wide variety of enlisted occupations, not just the high paced Battle Force soldiers.

Also pertinent to individual training and learning is the high likelihood that the Battle Force can expect to be the testbed for very new technologies. As potential opponents develop ways to counter our advanced capabilities, the Battle Force will receive new tactics and technologies so as to maintain a competitive edge. Such a flow of change will make career-long learning a necessity for Battle Force enlisted soldiers. This prospect is not unique to the military; Marquardt and Kearsley (1999, p. 28) quote with approval Shoshanna Zuboff's observation that "learning is the new form of labor. Continual learning is not only a prerequisite of employment but is a major form of work…[t]here is a convergence between work and learning."

AA2010 Soldiers and Leader Development

This section combines the DTLOMS topics of Quality Soldiers and Leader Development in AA2010 because the total AA2010 is likely to consist of three large groups of enlisted soldiers that differ enough in career paths and working conditions to require their own approaches.[7] In that the purpose of our study is concentrated on considerations for selection for entry into the Army and for promotion; we will deal here with issues in AA2010 that bear directly or indirectly on soldiers' qualifications. For several reasons, the information on enlisted soldiers that is available at this writing is sparse. First, the first report on the AA2010 Imperatives on Quality Soldiers and Leader Development and a study of military culture will appear after this project is complete. Next, the AA2010 war games that have been reported to date have focused on operational art at a level far above teams and individuals. Finally, work on designing the jobs of enlisted soldiers in the Battle Forces will not take place for years.

Differing from today's model of one general enlisted career path for the Active Army (with small variations), AA2010 appears to entail three major career paths: in the AXXI legacy

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[7] In some other contexts, the "S" in DTLOMS does not refer to the work or qualifications of soldiers; instead it refers to "soldier support," which is primarily materiel for the individual soldier. In our presentation, we have included those "soldier support" considerations under the Material section.

elements, in the Battle Forces, and in the AA2010-era support side. This prediction is an inference from the few speculations on enlisted staffing in AA2010 that have appeared so far (DCSDOC, 1997a, 1997b; Gay, 1998; Scales, 1998a, 1998b; Vollrath, 1997). Having three parallel systems could be administratively complicated, but the alternative of rotating soldiers freely among the three eras of capability and training (including remaining AOE elements) could degrade unit performance. However, the separate career path, unique training, and stabilization in units of Battle Force soldiers will increasingly differentiate them from the rest of the Army. At the same time, the specialization and technical orientation of the non-deployed support troops will make them less and less "green." The non-deployed support side will be increasingly civilianized, further changing that part of the force and its work environment. Homeland Defense forces will have to work with a variety of civilian agencies and non-governmental organizations that have their own cultures. The differences in the various Army components' background and work could strain the concept of the Army as a single institution with a set of common soldiering skills, at least as we currently know it.

Non-Battle Force Soldiers

The AXXI-era legacy elements, which include the Forward Deployed Forces and the Campaign Forces, will have a selection and promotion system much like the one described in Appendix D, with modifications engendered by AXXI requirements. But soldiers in the AA2010-era combat and non-combat sides of the force will differ from each other and from today in significant ways.

Partly because of AA2010's heavy reliance on civilian information and transportation infrastructure, Army support work will be more civilianized and contracted out than before. In the non-deployed support units, organizations will be flatter with leaders having a broader span of control. Units will be plugged into integrated worldwide databases that will control distribution directly from producers to users. Along with a low leader-to-led ratio, these units will have uniformed troops who are relatively specialized.

Many support soldiers will need such advanced technical training that the Army will have to compete for them on the job market through means like permitting enlistment at advanced ranks (i.e., lateral entry), giving special pay for special skills, and relying heavily on technicians from the Reserve Component. NCOs on the support side will function more as system managers and integrators than today. Officers are expected to become more technologically specialized, which may force NCOs to perform duties that officers formerly did (Winkler et al., 1998) and drive some NCOs' duties down to the junior enlisted. In the areas of transportation and information technology, differences between civilian and military work may be less than today, so the transfer of skills between the two sectors would be greater. A career for a support soldier could well consist of service in the Reserve Component with a number of extended activations beyond the annual ones for training.

Battle Force Soldiers

The Battle Forces are expected to make up only about one-third of the force from 2010 to 2025. Their enlisted ranks are expected to be built through a process that is more selective than that for the AXXI-era forces. For deciding who will serve in the Battle Forces and how the small

Battle Force combat units will function, the present day SOF are held out as a possible model. That model includes these features (Sanders, Rumsey, & Brooks, 1997):

- high selection standards
- long, physically and mentally demanding training
- organization in small teams
- mixing of roles across ranks
- cross-training of team members
- career-long service once qualified

Like SOF, Battle Force soldiers will be multifunctional, but in a new sense: Battle Force soldiers will be proficient on an increasing variety of systems, including weapons, information, vehicular, and defensive ones (Jezior, 1998). The activities of Battle Force combat soldiers will be more diverse, including operating and maintaining digital equipment, calling for fire, carrying out selected engineering tasks, operating non-line of sight weapon systems and direct fire ones, and mastering increasingly varied tactics, techniques, and procedures.

Battle Force teams will train and remain together for many years, ending up consisting of older (viz., 30- and 40-year old), more mature members. Rules for promotion, pay and retention, and retirement may well be different for Battle Force soldiers than for other AA2010 soldiers. Rank and grade structure within Battle Force units may follow new, non-traditional models.

The most detailed projection of Battle Forces soldiers' work is by Belenky (1997) from whom the quotation below was taken.

AA2010 units will consist of small (3-5 person) teams, with each team controlling massive firepower and a large volume of battle space. The teams will be engaged in variable, often high, tempo operations. For a given operation, each team will engage in 2-3 pulses of combat each day, with a typical operation lasting 5-7 days... The tempo of operations will be rapid; teams must act in parallel with other teams, often making decisions without consultation with other teams or with higher echelons of command and control. In this they will be aided by a shared, detailed, and accurate real-time picture of the battle space ...AA2010 units must be reusable after only minimal reconstitution...across multiple pulses of combat and across multiple deployments (pp 1-3).

For these units there will be a small span of control, a high leader-to-led ratio, and an emphasis on doctrine and drill. Given that there will be large numbers of small teams, there will have to be more soldiers with increased leadership roles.

Different sources agree on one point: operations in the Battle Forces will be highly stressful. A number of factors will compound that stress (Belenky, 1997; Biever & Echevarria, 1998). For one, Battle Forces will maintain a relentless tempo of operation to produce an early outcome. Next, weaponry of that era will have advanced sufficiently in accuracy, rate of fire, range, and destructiveness that, in some places, the deadly zone will be too lethal even to put soldiers into.

The threat of biological, chemical, and nuclear attack will be present, but much more so in urban operations than in the dispersed battlespace.

The margins of safety/error in the Battle Forces will be minimal. To reduce the logistical load, supply will be "just in time" and "just enough" (DCSDOC, 1997c). "...AA2010 leaders and soldiers [will have] to operate within highly compressed planning and execution cycles. Less time will exist to effect coordination or contingency planning. Soldiers at all levels will have to make decisions more quickly and most likely with a less than optimum level of information... [H]eightened levels of speed and mobility will change the relevant common picture of the battle frequently and often dramatically. Data only moments old may prove perilous to the user... Even small errors on such a battlefield can mean devastating fratricide or collateral damage" (Biever & Echevarria, 1998, pp. 3-4). "The future battlespace will have few or no sanctuaries..." (DCSDOC, 1998c, p. 8). "Blue attack must be quick and precise. Blue soldiers and leaders must rely on 'just in time' planning information. Battle drills and teamwork must be superlative" (Gay, 1998, p. 15). "In the [AA2010] concept, each team-member and each team is critical. If a team-member fails, the team fails. If the team fails, the operation fails... AA2010 units must be reusable after only minimal reconstitution. This means few casualties in operations...The small (3-5 person) teams, the tip of the spear of [AA2010] operations, will be extremely sharp. However, because the operational demands ... have the potential to exceed human capabilities, the tip of the spear will be not only sharp but brittle. This becomes especially important when we take into account not just one deployment but a series of deployments" (Belenky, 1997, pp.1, 3, 7). The expectation of "operating at the limits of human cognition" (Scales, 1998b) has given rise to requirements for future development of a variety of automated systems for relieving the cognitive load and improving decision making (DCSDOC, 1998c).

To counter the threats of precision fires and WMD, the Battle Forces will use dispersion, maneuver, and concealment. But spreading out the troops will dilute the psychological support of closeness to comrades and leaders above the team level. The extent to which situational awareness, electronic communication, agility, and concealment can compensate for the isolation of dispersion is not yet known. To counter stress, the Battle Forces will rely not only on systems and tactics, but also on the cohesion of soldiers who have trained together for a long time and, individually, have confidence in the wide variety of skills that they maintain.

Although high cohesion will be required in Battle Force teams to enable them to operate well under stressful conditions, leaders will need to build and manage that cohesion so as to have the intended results. Psychologists distinguish *task* cohesion from *social* cohesion. "*Task cohesion* refers to the shared commitment among members to achieving a goal that requires the collective efforts of the group. A group with high task cohesion is composed of members who share a common goal and who are motivated to coordinate their efforts as a team to achieve their goal" (MacCoun, 1993, p. 291).

Social cohesion in a team, in contrast, consists of members having bonds of friendship and personal closeness. Research shows that task cohesion predicts group performance but that social cohesion has an inverted U shaped relation to performance; moderate social cohesion is associated with the best performance, while too much distance or closeness can interfere. Units that are too strongly bonded socially may suffer from "groupthink," be distracted from work by socializing, reject the mission in favor of immediate group goals, and be susceptible to

committing atrocities (Miller, 1997). Two expected features of the Battle Forces could foster social cohesion: selection into the Battle Forces by special standards (i.e., eliteness), and stabilization of units for long duration. So Battle Force preparation must promote task cohesion and discourage either extreme of social cohesion.

Application of Battle Force Characteristics to Job Requirements

In the AA2010 era, enlisted leaders' jobs will be a mix of the old and the new. The requirements to perform, teach, reward, counsel, discipline, motivate, and the like, will endure. But two important aspects of AA2010 are likely to make enlisted leaders' jobs different from today's: the likelihood of three different sets of working conditions for the enlisted ranks and the pace of change. In the AXXI-era components of AA2010, the path up the enlisted ranks will be as it is today: shaped like a pyramid, with jobs losing much of their specialization and gaining leadership responsibilities in the upper ranks. Soldiers in AXXI units will work and fight much like today, interacting face-to-face with their supervisors. Units will continue to be organized hierarchically and career progression will follow more traditional patterns. In the Battle Forces, several factors will work to reduce the distinctions between leaders and led—training and working in small teams, career stabilization of units for prolonged training together, and maturity in the Battle Force soldiers from retaining them in the combat forces into their 30s and 40s, perhaps at a plateau of rank. In the small teams, tight unit cohesion and cross-training to take charge and cover for downed team members will foster an ethos where everyone leads and rank is not in the foreground. Battle Force soldiers will have strong institutional values and have soldiers as their reference group.

It is on the Battle Force soldiers that we directed the analysis to try to specify job requirements. The results are consolidated in Table C-7. We have used traditional or existing job requirement titles in most cases but have identified those aspects of AA2010 characteristics that will change or redefine the content of the requirement. In some cases, new performance requirement titles are listed. Because some evidence points to a Battle Force model staffed by soldiers taken from the existing Army (*a la* the SOF model) no first-tour or Army entry level job components analysis was included. Whether the end result of Battle Force structure is a traditional NCO structure or something totally new, the following should apply. However, these job components lists come heavily caveated: As is the case with all AA2010 information, these are very speculative and very preliminary. A constant and consistent updating should be a requirement that earmarks all AA2010 data, and the information in Table C-7 is no exception.

Table C-7
Army After 2010 Job Components for Battle Force NCOs

MOS/Occupation-Specific Technical Requirements: Battle Force soldiers will be multi-skilled, much as Special Forces are today. As they mature within the Battle Force (possibly over a 20-year period) their repertoire of expertise is expected to expand. Individual jobs will be measurably more complex. Each individual will be more important to the system. Jobs will be less standardized and less proceduralized with more individual innovation required. Jobs will require constant, career-long learning to keep up with changing systems.

Common Skills: Battle Force war fighters will have a wide variety of skills that they share with other Battle Force members but that are otherwise not common with the rest of the Army. At a certain level or for certain functions, all Battle Force members will be interchangeable because of this common, shared category of performance requirements. These common skills will likely cut across what we currently understand as combat, combat support (CS), and combat service support (CSS) but will also include softer skills and probably also whole new areas of information processing and artificial intelligence (AI) skills that we don't know much about yet. Processing large amounts of information with speed, accuracy, discipline, and discrimination will certainly be part of this common requirement.

Motivating and Leading Others: Leadership will take on a new definition within the Battle Force. While there will continue to be persons who are "in charge" of missions and operations, the existing rank-based structure and stricture of Army of Excellence (AOE) may not be operable. "Mission controllers" may be designated based on the requirements and characteristics of the mission, along with the qualifications of the personnel assigned. "Leadership" as a requirement will still be a critical part of Battle Force operations but it will be expected that all Battle Force members will be capable of leading as necessary. The Battle Force may not consist of traditional, permanent "leaders and led" members.

Team Building and Teamwork: The Battle Forces may or may not consist of permanent "unit" assignments and staffing, but even if units and assignments are used, they will likely be very unlike the existing concepts of "units." The Battle Force will operate on the basis of teams, with units above the team level organized *ad hoc* for missions or activities. Some of these may be very brief, lasting hours, while others may last weeks or months. Battle Force members in non-deployed situations may be physically remote, although telecommunication links among all Battle Force members will be characteristic of the organization. The ability to rapidly assemble an effective group of individuals into a team will be a necessity of operations.

Working With Others: The Battle Forces will be different from other Army elements in organization, structure, duties, training, and other ways such as pay and possibly dress. Yet they must interact with other elements, particularly Campaign Forces, and are dependent on other services and other nations in achieving operational success. They cannot be allowed to become an insular or élitist organization. They must be different without being apart.

Integrity and Self-Discipline: A force that is unique, equipped with the most up to date equipment, powerful, exclusionary, and made up of long term members, must be guided by the highest principles and a dedication to an external agenda. Battle Force members do not set policy; they carry out policy set externally. Members must reflect high Army ideals and commitments, consistent with and supporting national policy. The Battle Force must be self-monitoring to assure that the personal agenda that can arise from social cohesion (e.g., militias, hazing) do not interfere with pursuit of the Army's agenda, which is supported by task cohesion.

(table continues)

Table C-7 (continued)

Adaptability and Ingenuity: Despite all the technology and information sources that are anticipated to be available to Battle Force soldiers, they will not be automatons. Reacting, improvising, and revising will be crucial parts of Battle Force operations. Things will still go wrong and equipment will fail during mission but Battle Force soldiers still must perform effectively.

Communication: Conveying thoughts, ideas, conclusions, and recommendations will be a critical part of Battle Force operations. While relaying of much information will be automated, the human ability to communicate effectively will be, if anything, more vital to Battle Force operations. The ability of individuals to organize, present, conduct, and respond to verbal and non-verbal communications will be crucial.

Problem Solving and Decision Making: Near-perfect situational awareness, AI, automated planning, and automated decision assistance paradigms should all be available and workable for the Battle Forces. Still, soldiers will be required to apply human interpretations, apply sense and reason, and reach conclusions. Battle Force members will consistently be required to apply human judgements in confirming or overriding programmed or automated performance paths, all in very short periods of time and under pressures that we have not yet defined.

Stability: Battle Force soldiers will be used in combat situations that we currently cannot forecast. They may witness employment of weapons of mass destructions (WMD) including large-scale civilian casualties. They may be deployed while the U.S. homeland (and their families) are under missile or WMD threat or attack. They may be placed in situations that their training did not cover or be faced with unanticipated equipment failures. Invariably they will be expected to operate in very small groups and sometimes even alone. Battle Force elements can expect casualties that can destroy team nucleus. All these factors will increase mental and emotional stress under conditions that we cannot yet anticipate.

Directing, Monitoring, Supervising: Because of the team nature of activities and the interactive requirements, Battle Force members will all be responsible for monitoring the actions of each other. The nature of supervision and directing will change from the Army model we know with AOE. Directing and supervising in the Battle Force environment will be a more shared, collaborative effort rather than a sole responsibility of those "in charge." This function will likely extend beyond the immediate Battle Force members to Battle Force teams made up of joint services or foreign national members.

Planning, Organizing, Coordinating, and Executing: As with monitoring and supervising, this will become a team requirement, shared and participated in by many, unlike the AOE model where it is the requirement of a few. Because of the short time to do planning and organizing under Battle Force conditions, a totally new procedure to effectively accomplish this must be developed. While it may be somewhat automated, it must still have a distinct human component. At present, we cannot surmise how this future-planning model will operate.

Fitness: Fitness will likely have three components: physical, mental, and emotional. Physical fitness will likely be in terms of stamina and endurance rather than AOE characteristics of strength and leg speed. The ability to cycle, at will, between rest and activity may be increasingly important. Age, up to a point, may be incidental and the average age of the Battle Force soldier will likely be mid-30s. Mental fitness will include agility, comprehension, acuteness, and memory. Emotional fitness will probably require stress resistance.

(table continues)

Table C-7 (continued)

Security Clearance: The proliferation of systems for handling secure information will increase the number of enlisted jobs requiring high, and compartment security clearances. In all likelihood, all Battle Force members will require clearances. Whether these clearances need be higher, or more restrictive, than present day SECRET remains to be seen, but the final result could impact selection into the Battle Force.

Self-Development: Battle Force soldiers will be subject to constant change including the application of new technologies and innovations and refinements in doctrine, tactics, techniques, and procedures. External factors including political and cultural learning will be a constant requirement. Battle Force members will be expected to keep themselves current, employing the latest distant, distributed learning tools. They will have to know how to cope with the differences between live settings and the simulated settings in which many of their skills have been acquired and practiced. Initiative and innovation in self-development will be an expectation at the individual soldier level

Advanced Computer Skill: Although no one can accurately forecast the status of computer technology in the AA2010 era, it is assumed that there will be levels of expertise above user or basic level. This will include maintenance, troubleshooting, and whatever will be the 2010 equivalent of programming. Because of their reliance on technology, and their requirement to operate remotely, independently, and under harsh conditions, Battle Force soldiers will have to be higher order computer technicians as part of their job.

Training Others: Because training for service in the Battle Force will be largely by apprenticeship, then Battle Force NCOs will have a richer training responsibility than NCOs in previous eras. These NCOs will need to be effective mentors to the apprentices. Although some aspects of this will be taught to the trainers, some selection will be useful here, as not everyone is cut out to be a mentor/instructor.

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Appendix D

Advancements and Promotions for Enlisted Personnel (E2 – E9): An Overview[1]

An understanding of how the enlisted promotion system currently functions, particularly as applied to those in the noncommissioned officer (NCO) ranks, is essential to any consideration of changes or supplements to that system. This appendix presents a basic overview of that system. Although the emphasis is on NCOs, a minimal amount of information on promotion in the lower enlisted grades (E2 – E4) is presented as well.

Historically, the American Army started out in 1775 with just three enlisted ranks: Private, Corporal, and Sergeant. Unlike the officer corps whose structure has remained fairly stable throughout history, the enlisted structure has almost continuously changed, reflecting at times not only a rank hierarchy but a job hierarchy as well. During the Civil War, there were 29 enlisted designations ranging from Sergeant Major to Enlisted Men of Ordnance. This plethora of enlisted positions was retrenched post-Civil War, but by the end of World War I there were 128 different enlisted designations with most titles determined by job assignment. Titles also determined pay scales during World War I. In 1920, the "modern" enlisted system was adopted with the establishment of seven enlisted grades. Also at that time, the concept of pay grades, which applied across all Army jobs, was set with the establishment of six Army pay grades. In the almost 80 years since, this rank system has endured, although not without constant refinement. During World War II the concept of "technical sergeants" was introduced (which lasted in the form of "specialists" until 1985 when all but the E4 Specialist was eliminated). In 1958, two new grades (E8 and E9) were added to the structure and in 1978 the position of Sergeant Major of the Army was created, although this later addition did not reflect a change in rank structure (Arms, 1999; U.S. Army Adjutant General, 1999).

Promotions play a vital role in Army functions and they fill a variety of needs both for the Army and for the individual. Consider:

- The Army is an organization based on hierarchies of responsibility and authority. About 50% of the Army enlisted force are in the NCO ranks, in theory supervising the other 50% of the enlisted force (or a 1:1 leader to led ratio). In reality, the supervisory structure is pyramidal, with most NCOs supervising other NCOs. Promotions are the essential ingredient to make the Army as an organization work. One of the first things that a new soldier learns about the Army is the recognition of the Army's rank structure.

- Promotions provide incentives for performance and retention.

- Promotions fulfill a basic individual need for recognition. They convey authority and responsibility. A significant aspect of the Army promotion system is that it is accompanied by visual indication of status (insignia), worn by the holder and universally recognized by others in the system; the effect of a promotion is immediate. Also by being

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[1] Information for this appendix is taken primarily from AR 600-8-9 "Enlisted Promotions and Reductions" effective 1 December 1991, with changes. It is supplemented with information from the US Army Personnel Command (PERSCOM) taken from their Website at http://www-perscom.army.mil.select

linked, at least indirectly, to maturity and experience, promotions bestow a mantle of sagacity and influence which increases with each promotion level.

- Promotions are financially rewarding. An E2 makes more money than an E1. Other tangible rewards such as housing, association, and privilege are also linked to the promotion system. Rank conveys with it advantage and reward to the individual.

Basic to the understanding of the enlisted promotion is the understanding that there are three different types of systems that guide promotions: decentralized, semi-centralized, and centralized. In the decentralized system all the promotions are controlled and administered within the soldier's unit. These apply for promotion to Private (E2), Private First Class (E3), and Specialist (E4). Semi-centralized promotions apply for soldiers being promoted to Sergeant (E5) and to Staff Sergeant (E6). In the semi-centralized system, all promotion procedures are conducted in the soldier's unit but Department of the Army (DA) controls how many of soldiers in each military occupational specialty (MOS) get promoted and when those promotions occur. In the centralized system, all promotion procedures, as well as the authorization of promotions, occur at DA level. This system applies for promotion to Sergeant First Class (E7), Master Sergeant (E8), and Sergeant Major (E9). Each of these systems will be described in detail.

There are two additional concepts that are essential to understanding the promotion system. The first of these are *time-in-service* (TIS) and *time-in-grade* (TMIG). Time-in-service is the number of months that the soldier has been on active duty, and usually corresponds to the day the soldier was ordered to travel to his or her initial entry training station. Time-in-grade is the number of months that a soldier has held his or her present rank. Both of these are important because they are the primary factor for determining *eligibility* for promotion. DA determines, and announces, TIS and TMIG figures periodically for each Army rank. Table D-1 shows the current TIS/TMIG requirements for eligibility for promotion to the grades indicated.

The second additional concept necessary to understand promotions is the idea of *waivers*. Commanders can request waivers for any prerequisite to promotion, however the most common waivers involve TIS and TMIG.[2] Waivers are a way of promoting deserving and exceptional soldiers ahead of their peers and, generally, waiver authority is delegated to the commander at the O5 (Lieutenant Colonel) level. The Army also applies a system known as *primary* and *secondary* zone promotions to both the semi-centralized and centralized promotion systems. Under this program, all soldiers can be considered for promotion at a point early in their career when they pass through the secondary zone. Secondary zone promotion criteria are the same as for primary zone, but the number to be selected and the promotion rates are established by DA separately from the primary zone. Table D-1 shows the current eligibility threshold for semi-centralized promotions in the secondary zone for E5 and E6. (Secondary zones for centralized promotions are more variable and are announced with each board.) Again, the goal is to allow some outstanding soldiers to advance ahead of their peers.

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[2] Generally, only a single waiver is allowed for a soldier. Waivers for TIS and TMIG are usually limited to one-half of the DA specified time.

Table D-1
Promotion Eligibility Requirements, Without Waivers.

Promotion to Grade:	TIS Primary	TMIG Primary	TIS Secondary	TMIG Secondary
E2	6 months	N/A	N/A	N/A
E3	12 months	4 months	N/A	N/A
E4	26 months	4 months	N/A	N/A
E5	36 months	8 months	18 months	8 months
E6	84 months	10 months	48 months	10 months
E7	72 months[a]	Varies	Varies	Varies
E8	96 months	Varies	Varies	Varies
E9	120 months	Varies	Varies	Varies

Note. TIS = time in service. TMIG; = time in grade; N/A = does not apply.

[a]The apparent anomaly in TIS between E2 and E6 reflects different regulatory requirements guiding the different promotion systems.

Decentralized Promotion System

The soldier's first exposure to the Army promotion system is the decentralized system that applies to grades E2 – E4. This exposure starts almost as soon as soldiers enter the Army and is applied while soldiers are still acquiring soldierization and MOS-specific skills. Most promotions to E2 through E4 are so automatic that they are termed "advancements" rather than promotions. That is, soldiers are expected to progress through these grades and it is the exceptional soldier (in the pejorative application of the term exceptional) who does not. These advancements (or precluding an individual from advancement) are all decided and administered within the soldier's unit. Likewise, selecting individual soldiers to be advanced ahead of their peers (through waivers) is also done by the soldier's immediate commander (usually delegated to the Captain [O3] level).[3]

One important aspect of the decentralized promotion system is the designation of individuals to be *Corporals*. Strictly speaking, this is not a promotion but a conversion. Commanders can convert Specialist E4 to the rank of Corporal E4 if the individual is occupying a position which is authorized to be filled by an NCO (the option to do so rests with the commander; it is not required). Although the pay grade (E4) is the same, Corporals wear a different insignia and are NCOs. As such, they have certain authority and prestige that Specialists do not. Once converted, Corporals generally retain that designation even when they no longer fill the NCO slot. In our study, we included the position of Corporal E4 in the considerations for Junior NCO (along with

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[3] There are a variety of other programs that facilitate accelerated promotions in the grades E2 – E4. Many of these are incentives and recognition during the soldier's initial entry training period. For example, a soldier who completes Ranger training can be advanced to Specialist E4 as soon as he completes 12 months time-in-service.

Sergeant E5) while we kept the position of Specialist E4 as part of the first tour soldier description.

Semi-Centralized Promotion System

The semi-centralized promotion system is used for promotions in the grades of E5 and E6. It is "semi-centralized" in that the promotion selection authority is delegated to field grade commanders in the grade of Lieutenant Colonel (O5) or above. All promotion processing including board appearance and promotion point calculation is done in the soldier's unit. However, DA determines the promotion point cutoff scores monthly for each MOS on the basis of the scores reported by the field and the needs of the Army by grade and MOS. The DA maintains centralized promotion standing lists and issues the orders for promotion.

To be eligible for promotion under the semi-centralized system, the soldier must meet TIS and TMIG minimums for either the primary or secondary zone and receive the commander's favorable recommendation. Additionally, soldiers must have completed the Primary Leadership Development Course (PLDC) of the NCO educational system (NCOES) for promotion to E5. To be eligible for promotion to E6, an E5 must have successfully completed the applicable MOS basic NCO course (BNCOC).

The semi-centralized system uses standard promotion scoring forms with predetermined promotion point factors. The system is organized around the *Promotion Point Worksheet (DA Form 3355)*. This form was developed when there was a testing portion to soldier evaluation in the framework of the Skill Qualification Test (SQT) which existed into the early 1990s. At that time the Promotion Points Worksheet was based on a possible 1000 points. After the demise of the SQT, the same form was retained but the total possible points was changed to 800. Table D-2 illustrates how the 800 points are awarded.

Table D-2
Point Award Dispersion for Semi-Centralized Promotions

Area	Points Possible	How Earned[a]
Duty Performance	200	Totally up to the commander. No specified Criteria
Awards and Decorations	50	A specified scale: 35 points for Soldier's Medal; 20 points for Air Medal; 15 points for CIB; 5 points for Parachutist Badge; 5 points for Certificate of Achievement
Military Education	150	30 pts for first NCOES course; 3 pts per week for each additional course; 30 pts for Ranger School; 2 pts per week for any training that issues an official Certificate; 1 pt for each 5 credit hours of military correspondence courses
Civilian Education	100	1 pt for each semester hour; CLEP, DANTES credits; 10 pts for GED
Military Training	100	50 points for qualifying Expert with assigned weapon; 50 points for max score (300) on APFT
Board Appearance	200	Based on 6 criteria, averaged.

ªFor Awards and Decorations, Military Education, and Civilian Education, only a few examples are listed. In AR 600-8-19, a complete listing assigns points for all possibilities. The area of Military Training is limited to Weapons Qualification and the Army Physical Fitness Test (APFT).

For semi-centralized promotions, all recommended soldiers must appear before a locally constituted promotion board. The board must consist of at least three voting members and a recorder (non-voting). Each board has a president who may elect to be a voting member or a non-voting member. Board members may be all officer, all enlisted, or a mix, but all must be senior to the soldiers appearing before the board. At least one voting member must be of the same gender as the soldier being evaluated. All boards must have an ethnic mix, even if no minority ethnic soldiers are appearing before the board, but no board may consist exclusively of minority ethnic members. The board is permitted to use a question and answer format only; soldiers cannot be required to perform hands-on tasks or to otherwise demonstrate performance.

A soldier who is recommended by his or her commander to appear before the promotion board is considered, by virtue of that recommendation, to be fully qualified in his/her primary MOS and board members are not allowed to raise issues of a soldier's MOS qualification. It is up to the board members if they want to review a soldier's records, including the remainder of the Promotion Point Worksheet. Each board member rates soldiers in six sub-areas:

- personal appearance, bearing, and self-confidence,
- oral expression and conversational skill,
- knowledge of world affairs,
- awareness of military programs,
- knowledge of the Common Tasks Soldier's Manual, and
- attitude.

Members are allowed a set amount of points in each sub-area with a maximum total of 200 points. Each member awards points independently; the recorder adds up the sub-area scores, divides for an average and records the average points on another form for the soldier's total board points.

Each month, HQDA selects the cutoff cores for promotion to E5 and to E6. This is done independently for each MOS and is based on projected vacancies for that MOS. The actual cutoff number is determined by the promotion point scores submitted by all of the personnel service companies in the field. In a simplified example, the process works like this: Suppose that there were 100 projected vacancies in the grade of E5 in the month of January in MOS X. The DA looks at the consolidated list of all eligible, recommended E4 soldiers in MOS X and counts off 100 soldiers. If the promotion points total of that 100th soldier is 512 points, that becomes the cutoff for MOS X for the month of January. The MOS X soldier who was 101st on the list with 511 promotion points is not "next up" for February because the process starts fresh each month. If, in February, there were only 50 MOS X vacancies projected, the cutoff for MOS X might rise to, say, 600. As each month passes, there is an influx of new scores; if the soldier who had 511 points did nothing to change his score, he could be farther from promotion than ever.

In reality, MOS projections are forecast and averaged over a fairly long period of time so that large month-to-month variations within an MOS, such as in the preceding example, are rare. However, differences between MOS can be striking. There is a wide variation in cutoff scores each month by MOS. For MOS that are short NCOs, everyone may be promoted every month, while MOS which are small and have little turnover may go for months, without promoting anyone. To assure some minimal level of qualification, DA has established a floor of 450 points for promotion to E5 and 550 points for promotion to E6. But in overstrength MOS or in MOS with little turnover, soldiers often have little control over their promotion chances.

Centralized Promotion System

The centralized promotion system affects all soldiers being considered for promotion to the grades E7, E8, and E9.[4] In this system, all processing is done at HQDA level and promotion evaluation is done by an Army-wide centralized board, based only on the soldier's official military records. Boards are constituted on an as-needed basis based on a Memorandum of Instruction (MOI) issued by the Army Deputy Chief of Staff for Personnel (DCSPER). Because each MOI is different, centralized promotion board procedures and criteria are harder to typify than they are for the other two promotion systems. Each board is headed by a general officer and boards contain both officer and NCO members. The NCO members must be senior to the soldiers being considered by the board. Each board is divided into *panels* with a minimum of three voting members on each panel,[5] assisted by a non-voting administrative NCO. There will usually be around 9 to 11 panels that are organized by Career Management Field (CMF) with the make-up of the panels reflecting overlapping and related CMF composition. Board members are administered an oath.[6] As noted, no individual appearances are allowed in front of the boards although a soldier being considered may submit a letter to the board calling attention to any matter the soldier feels warrants special attention. Letters are seen by voting members of the panels.

Records available for board review include all administrative data on the soldier such as date and place of birth, height and weight, dates of service, history of assignments, military schooling, promotion records, and civilian schooling. Also available to the board is a record of awards and decorations, Article 15s, courts-martial records, letters of reprimand, course completion certificates and transcripts. A record of the individual's evaluation reports (NCOER) is also available. Many records are provided in duplicate from different sources and it is the individual NCO's responsibility to see that all records are up-to-date, accurate, and do not contain

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[4] The DCSPER MOI announces the actual TMIG calendar dates for both the primary and secondary zones of consideration. Zones are open-ended at the senior end (e.g., "all E7 with a date of rank of 30 September 1998 and earlier"). All NCOs who fall within that calendar range will have their records considered for promotion, even if they have been considered before. There are no individual promotion recommendations, as such, from the field to DA.

[5] AR 600-8-19 establishes this number. Other sources identify the requirement for "at least four members."

[6] Part of that oath is usually not to reveal the proceedings or the procedures of the board. As a result, in the past, the procedures followed by centralized boards have been very speculative. Recently, PERSCOM has become more open about the conduct of centralized boards and much information can be obtained from their Website. Much of the information in this section comes from "Background on DA Enlisted Centralized Selection Boards," dated April 1999, which was posted on the PERSCOM Website during the summer of 1999.

conflicting information. Each NCO must also have on record a full length, color, official photograph in uniform with all authorized badges, tabs, awards, and decorations.

Centralized evaluation boards are supposed to consider the "whole soldier." That is, no single factor should be considered as overriding in determining qualification for promotion. Factors that have been identified for consideration include:

- Scope and variety of assignments
- Estimate of potential for performance in the next higher grade
- Trends in efficiency
- Length of service and maturity
- Awards, decorations, and commendations
- Military and civilian education[7]
- Moral standards
- Integrity and character
- General physical condition

As noted, the procedures in selecting persons for promotion can vary with each board. However, PERSCOM offers the following as an "example" of the procedure used by centralized boards (PERSCOM, 1999). The panel members evaluate each file using a numerical system as depicted in Figure D-1. Scores range from 1 to 6 with a '+' or '–' used to further amplify the numerical ratings. Scoring is done independently and then averaged; no board consensus or discussion of individual records is allowed, although individual panel members may request additional information before voting if record discrepancies are discovered.

6+/- Exceptional Performer
5+/- Strong Performer
4+/- Solid Performer
3+/- Fully Qualified Performer
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2+/- Weak Performer – Retain in Grade
1+/- Poor Performer – Refer for Qualitative Management Program (QMP)

*Fully qualified line

Figure D-1. Basic eligibility thresholds for semi-centralized enlisted promotions.

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[7] Soldiers must have completed their MOS advanced NCO course (ANCOC) to be eligible for promotion to E7.

The board identifies all soldiers who are "fully qualified" (averaged ranking of 3- or above). Fully qualified soldiers are then rank-ordered based on their averaged numerical score into a "best qualified" list. This is done separately for each MOS. HQDA determines the number of soldiers, by grade, in each MOS, based on projected vacancies in that MOS. That number is matched to the board-generated numerical scores. This, in effect, establishes a "cutoff," although this term is not used in the centralized system and cutoff scores are not published as they are in the semi-centralized system. Promotion lists are established and promotions are made monthly from the list based on MOS vacancy, rank, and budgetary considerations.

The board also identifies soldiers for the Qualitative Management Program (QMP) (see Figure D-1). The QMP applies only to NCOs in grades E6 through E9 and is intended as a mechanism of ridding the Army of NCOs whose performance or conduct has deteriorated. The following are identified as criteria for invoking the QMP (1989, AR 601-280):

- Moral, professional, or ethical conduct incompatible with the NCO corps and the professional Army ethic.

- Lack of potential to perform NCO duties in the current rank.

- Decline in efficiency and performance over a continuing period as reflected by NCOERs.

- Failure of an NCOES course.

- Inability to meet physical fitness standards.

- Failure to comply with the Army body composition (weight) program.

- Existence of reenlistment bar imposed by a field commander.

Soldiers selected for QMP have the right of appeal. Soldiers who do not appeal or lose their appeal will be honorably retired in their current rank if otherwise eligible for retirement. Soldiers with 17 years 9 months service at time of QMP notification may be retained until retirement eligibility is reached.

Noncommissioned Officer Evaluation Report System (NCOER)[8]

Although not formally a part of the promotion system, the NCOER system plays a vital role in determining promotions, particularly in the centralized system at grades E7 through E9. Moreover, the NCOER system serves to define those skills and attributes which the Army has designated as being critical to being an NCO. An understanding of the system and its emphasis has a direct bearing on understanding the NCO promotion system.

The NCOER system applies to all NCOs starting with the rank of Corporal E4[9] and continuing though the ranks of Sergeant Major, including the Sergeant Major of the Army. It is a

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[8] Information in this section is taken from AR 623-205 "Noncommissioned Officer Evaluation Reporting System." This regulation is under revision and the new regulation is due for release in October 1999. One of the anticipated changes is that the Army Values will receive an added emphasis in the rating form. The Army Values are Loyalty, Duty, Respect, Selfless-service, Honor, Integrity, and Personal Courage.

[9] The NCOER does not apply to Specialist E4; another distinction between the ranks of Specialist and Corporal.

two-part system, consisting of a proceduralized, continuous counseling requirement (which includes a written record but which is not a part of the soldier's official records) and a formal NCO Evaluation Report Form (DA Form 2166-7) which is an official record. NCOERs are done continuously throughout a soldier's NCO career. Reports must be submitted at least annually but also when there is a change in the rater (each NCO has a pre-designated rater and senior rater) or when the NCO is due to change raters, such as a pending reassignment. Raters must have been in position for a minimum of 90 days to render an NCOER. Special "complete-the-record" reports can also be submitted when the NCO is to be considered by a centralized promotion board, a school selection board, or a Sergeant Major selection board, providing certain criteria are met. Special NCOERs can also be submitted under adverse conditions such as when a relief-for-cause occurs. However, certain adverse information is precluded from the NCOER including Article 15, court-martial, flagging action, letter of reprimand, or civil trial (although these are included in other parts of the soldier's official record). The rated NCO must be given a copy of his/her NCOER. NCOERs may be appealed.

As noted, NCOERs are continuous and cumulative. The intent is that a pattern of performance and evaluation be established over time (although the current system is only about 10 years old) and that no single NCOER, good or bad, be the criterion for decisions.[10] The following list describes the five major areas that are evaluated in the NCOER:

- **Competence.** The knowledge, skills, and abilities necessary to be expert in the current duty assignment and adequate in other assignments within the MOS. It includes reading, writing, speaking and basic mathematics. It also includes sound judgment, ability to weigh alternatives, form opinions, and make good decisions.

- **Physical Fitness and Military Bearing.** Physical fitness is both mental and physical. It includes strength, endurance, stamina, flexibility, speed, agility, coordination, and balance. Total fitness includes weight control, diet, nutrition, avoidance of tobacco products, control of substance abuse, stress management, and physical training. Military bearing consists of posture, dress, overall appearance, and the manner of physical movement. Bearing also includes an outward display of confidence and enthusiasm. The NCO's current height and weight and latest APFT score are reported as part of this block.

- **Leadership.** Influencing others to accomplish the mission. It consists of applying the leadership attributes of beliefs, values, ethics, character, knowledge, and skills.

- **Training.** Preparing individuals, units, and teams for duty performance. It involves the teaching of Army doctrinal skills and knowledge.

- **Responsibility and Accountability.** Consists of the proper care, maintenance, use, handling, and conservation of personnel, equipment, supplies, property, and funds.

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[10] Like most personnel evaluation systems, the NCOER suffers from inflation and a mid-range rating ("meets standard"), which should apply to most NCOs probably puts those NCOs at a disadvantage. However, Army leadership does have a feedback program in which excellence ratings have to be supported by quantifiable data as part of the report.

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